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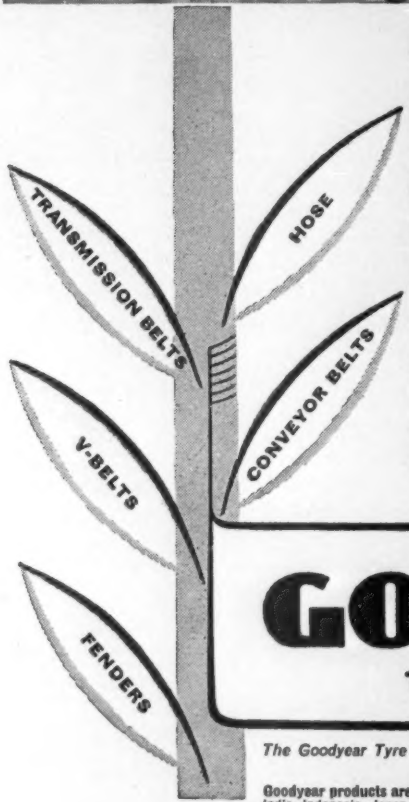

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IRON AND COAL
TRADES REVIEW

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Steel Expansion

DECISION of Dorman Long & Company to spend nearly £7,000,000 on an expansion of steelmaking capacity on the North-East Coast is yet another declaration of faith in the future of steel. It follows on the heels of the Iron and Steel Board's annual report, designedly factual in its contents, but with a vein of optimism running throughout. A report by the OEEC Iron and Steel Committee on steel trade movements in 1958 and 1959 also takes a cheering view of the future.

The Dorman Long plan to raise steel production is supplementary to the £60,000,000 development plan completed last year, and, of course, the company is not alone in announcing major expansion schemes. All the big steel companies and many of the smaller units, are going ahead with new development plans. Britain's 1960 steelmaking capacity is put officially at 25,500,000 tons, and plans are in hand to raise this figure to 29,000,000 tons in 1962. A production level of at least 32,000,000 tons in 1965 is regarded as possible. The estimated cost of fresh development proposals already before the Iron and Steel Board is £200,000,000, which includes £140,000,000 for the new strip mills at Llanwern and Ravenscraig. This figure compares with £115,000,000 in 1957 and £41,000,000 in 1958.

To embark on expenditure of this magnitude requires great courage on the part of the steel companies and of the Iron and Steel Board, which is responsible to the Government for the overall conduct of the industry. It is based on a profound belief in the future of steel and a conviction that consumption of steel will continue to grow. The OEEC committee notes in its report on the European iron and steel industry in 1958 and 1959 that although a recession was met with in those two years the level of investment was not materially affected. Since the beginning of 1960 capital spending by the steel industry has been stepped up both in Britain and in Europe as a whole.

All the signs suggest that the faith in the future which is leading steel producers everywhere to increase producing capacity will be amply justified. This is a world still hungry for steel despite the vast increase in production which has been achieved in the post-war years. If we in this country are to double our standard of living within the prescribed period of years and if the many plans for the improvement of conditions in the underdeveloped countries are to be brought to fruition, there will inevitably be a continuously expanding demand for steel. It cannot be expected that the production curve will be without its peaks and valleys. One can assume that the curve will trend steadily upward, and hope that the valleys will be shallow, but it is too much to expect that setbacks will not occur from time to time.

For the first time for a number of years European steel production fell in the second quarter of 1958 below the level of production a year earlier. Not until the second quarter of 1959 was a rising trend resumed, but then output expanded markedly. Why was the steel industry so vulnerable to so slight a pause in the expansion of the European economy? Seeking to answer this question and to decide how recessions might be avoided or their effects mitigated in future, the OEEC Iron and Steel Committee sees the principal cause of the 1958-59 recession in the inflation of order-books during 1955 and 1956, in the resulting delivery delays, and in the excessive stockpiling of steel by merchants and consumers. It suggests that the immediate task confronting the industry is to do all it can to avoid the recurrence of these conditions. "Hardly less urgent—and it is here that governments and steel consumers' associations also have a role to play—is the need to impress upon all concerned the necessity of collecting adequate, frequent, and up-to-date statistics about the consumption of steel, about new orders and orders on hand, and about stocks of steel in the hands of merchants and consumers." The committee also urges that further consideration be given to drawing up a series of measures to which resort could be had, if the need arose, to encourage consumption of offset destocking. If this were done, the committee suggests, the tribulations of the industry in 1958-59 would not have been endured in vain.

FIREDAMP DETERMINATIONS

UNDER the Coal and Other Mines (Ventilation) Regulations, 1956, made by the Minister of Power under the Mines and Quarries Act, 1954, determinations of firedamp-content required to be made in mines, one in every week or 30 days, must be made at the appropriate stage of the mining operations on the last working day of the week, other than a Saturday, on which the operations comprise that stage.

The Coal and Other Mines (Ventilation) (Variations) Regulations, 1960, which come into operation on August 1, vary the 1956 regulation so that such determinations may be made at any time during the shift commencing on a Friday and ending on a Saturday if the appropriate stage of the operations occurs at that time.

Passing Thoughts . . .

IN view of the accumulation of low-grade coals, I believe it is important that authorization for the building of further stations at pithead of the Westfield type should be given as soon as possible, with resultant benefits to the coal and gas industries as well as to the consumer. The implementation of such a plan will mean the upgrading of our poor quality coals—now redundant—to a smokeless, ashless, sulphur free, labour-saving fuel in keeping with modern requirements.—MR. AMBROSE CONGREVE, chairman of Humphreys & Glasgow, Limited, in a letter to the Financial Times.

The bright boy from a mining village is likely now to receive his education at a grammar school than in the pit. Must he therefore be debarred from serving his father's union? Perhaps Mr. Ford's election offers him a glimmer of hope.—The Guardian.

The Abertillery disaster underlines the price we pay for coal in men's lives. Unnoticed go those lives ruined by silicosis. . . . Would it not be more profitable in the long run to press on with the atomic power programme and aim to cease to use coal and gas altogether?—Lady Raglan in a letter to the Western Mail.

Public ownership may be among the 10 most urgent [questions] which face us, but is not among the six most urgent and it would be silly if our party came to pieces about something which is not even among the urgent problems of 1960.—From "The Socialist Imagination," a Fabian tract by Wayland and Elizabeth Young.

Whatever administrative method is used, in the end a concept of energy available in various forms must take the place of competing fuels and be given workable economic expression if future fuel and power investment is to be founded on a more rational and less wasteful basis.—MR. ARTHUR PALMER, former Labour MP, in a letter to The Guardian.

Frankly it is possible to have far more sympathy for the railwaymen than for the miners since their conservatism is in some respects a desire to preserve what is valuable in the present system. . . . The miners' opposition to change seems to have few redeeming features.—Birmingham Post.

There is everything to be said for trying to equate fairly the conditions of competition between rail and road or between coal and oil. But there will be no public sympathy for any conscious repression of the newer forms of fuel or transport, and nothing that trade union leaders may say will convince the public that workers in the older industries should be protected at that price.—The Times.

The retention of nationalization in all its pristine purity is completely irrelevant to either coal or railway transport. What matters is to raise the level of productivity in the mines and to make British Railways much more efficient than they are today. . . . These are the real issues which the unions ignore in their curious devotion to their ancient and exploded illusions.—Yorkshire Post.

PARTY OF 10 Scottish manufacturers, representing the capital and consumer industries, are to visit Russia next month to try and interest the Soviet trading authorities in Scottish products.

Colvilles' £5,000,000 Modernization Plan

ONE of the major suppliers of alloy steels in the country was the future forecast by Sir Andrew McCance, chairman and managing director of Colvilles, Limited, for the company's modernized Hallside Works, near Glasgow.

SIR ANDREW MCCANCE

The plant, which was closed down in 1958, has been rebuilt and will be in production by September, Sir Andrew said on Tuesday. With a new billet mill to supply special steels to the motor industry and new melting facilities, the total cost of the modernization will be nearly £5,000,000. Output will be between 3,000 and 4,000 tons a week, making it one of the biggest producers in the country of special and alloy steels. Sir Andrew said that probably 70 per cent. of the alloy steels produced were used by the motor industry and any manufacturer who was dealing with the motor industry could be assured of steel supplies. It would be a considerable enlargement of the tonnage hitherto available in the area.

"While Hallside will become one of the biggest producers, on a tonnage basis, of these steels, Colvilles has already been providing a very substantial tonnage from Dalzell Steelworks, at Motherwell. Now we are concentrating this type of production at Hallside, which will leave room for more production at Dalzell for other needs," he said.

The mill is already in operation and training some of the men earmarked to work there has begun. The melting shop is also being modernized and a new 80-ton electric furnace has been approved.

India's Plans for Heavy Industry

EMPHASIS of India's third Five-Year Plan, which begins in April, will be on heavy industry and agriculture. This is given in a draft outline of the plan issued by the Government on Tuesday. It is planned to spend Rs. 102,000,000,000 (about £7,650,000,000) on the plan, of which 15,000,000,000 (about £1,154,000,000) will be spent on industry and minerals.

By 1966 the Government hopes to increase steel ingot production to 10,200,000 tons. This will be done by expanding production in the three existing State-owned steel plants and by the setting up of a fourth plant. Coal production is to be increased from about 60,000,000 tons to 97,000,000 tons and the power output is to be doubled to 11,800,000 kW.

Of the total investment, the State will provide Rs. 16,750,000,000 and the balance will come from private investors.

Coal at the Crossroads

NCB CHAIRMAN'S ADDRESS AT LLANDUDNO

"OPINIONS may differ, but I believe that provided there is full appreciation of the reasons for such actions, it is entirely proper for nationalized industry to take account, in its policy decisions, of the requirements of the national interest. But when one sees the whole weight of criticism directed towards discrediting nationalization, because of results that are directly and solely attributable to policies carried out in the public interest, then the need to look again at the position arises," said Sir James Bowman at Llandudno yesterday (Thursday).

It was Sir James's fifth and final address as chairman of the National Coal Board to the annual conference of the National Union of Mineworkers, and he reminded delegates that he had had the unique opportunity of seeing the progressive changes in the industry from almost every point of view—as coal-face worker, lodge secretary, general secretary of the Northumberland Area, vice-president of the union, divisional chairman of the Northern (N&S) Division, deputy chairman of the NCB and now as chairman.

He believed nationalization of the industry had been an outstanding success and had served the country well. It had also brought tremendous and revolutionary advances for the miners. But, he believed, were they able to begin again, some of the important policy decisions taken 13 years ago would now be strongly resisted and, in all probability, avoided.

Challenge and Opportunity

Measures such as price control of coal, subsidizing peak-price imported coal, and minimizing the danger of serious social consequences on mining communities because of the drop in demand for coal, represented a degree of public service which could properly be expected from a publicly-owned industry, but they had only been carried out at heavy cost and had exposed the industry to the full blast of competition without the protection of financial reserves.

Sir James emphasized that no one outside the industry interfered with or influenced the board's consideration of claims put before it, but further deficiencies in its financial results could lead to deficiency financing—borrowing money in order to pay wages, etc.—and that would unquestionably lead to greater, not less, political interference.

"The coal industry today has reached what I regard as one of the most crucial stages in its history," Sir James continued. "Our task must be to regulate our production policies to the trend of demand, in order to make a steady reduction in stocks. There are disbelievers who doubt our ability to do this. My answer to these doubting Thomases is that by the end of next year, a major part of those stocks of untreated smalls will have been lifted and sold."

Considering some of the challenges and opportunities facing the industry, Sir James said no prospect could be seen of a lasting return to a seller's market. Everyone must be made aware of the change that was needed in the approach to the production and selling of coal if the industry was to continue in anything approaching its present shape.

The future picture was, however, not all black. The board had been able to give the Central Electricity Generating Board assurances of its capacity to produce a secure and plentiful supply of coal for the power stations in the future and demand for such purposes might eventually rise to over 80,000,000 tons in the late 1970s. That would require a change of emphasis in production techniques and planning at the pits, and a carefully planned, progressive increase in power-loaded output at high levels of productivity and low costs of production.

The board must also take into account the valuable domestic market and aim to keep the average proportion of large coal at least at about 23 per cent. of present level of production. "Our major aim is to evolve a power-loading machine capable of achieving as high a percentage of large coal in a wide range of conditions as that obtained from conventional faces. Once that is achieved the need for laborious hand-got production will vanish, except in those cases when geological conditions make it necessary."

Sir James promised that the pilot-scale plant at Birch Coppice to process an open-grate smokeless fuel from smoky small coal would be producing batches of fuel for testing by the end of the year. If the product turned out a winner, plans were fully prepared to go into rapidly expanding commercial production.

"Today, although we are by no means out of the wood, nevertheless, by the combined efforts of everyone in the industry, we are successfully reaching the end of the three-year period of adjustment and seeing production and demand in balance."

Sir James insisted that the industry's record entitled it be given a fair chance in running its affairs. He thought it would be a sad day for Britain if the capacity of the industry and security of mining communities were to be sacrificed for the sake of snatching at the very temporary advantages offered by the import of large quantities of oil produced in politically unstable areas of the world.

He explained that the NCB expected to sell 5,000,000 tons of coal on the export market—at a loss of £7,000,000, compared with inland prices—in order "to keep a foot in the door." "But," he added, "when I hear the criticisms thrown at the board for not increasing exports, I wonder whether we should continue to bear these losses."

There was only one way they could meet the competition from oil and other fuels and that was through a continuous rise in efficiency. There had already been a fine response to the demands of the situation, but the future was going to be one of continuous challenge and there was still need for the idealism of resting day.

Appointments

Sutcliffe's Northern Technical Manager

APPOINTMENT is announced by Richard Sutcliffe, Limited, mining machinery and mechanical handling equipment manufacturers, of Wakefield, of Mr. Fred Smith, until recently mechanization engineer of No. 8 Area, North-Eastern Divisional Coal Board, as district technical manager for the North of England. He will be responsible for all the company's sales, both mining and industrial, in Durham, Northumberland, Cumberland, Westmorland and the industrial Tees-side area of Yorkshire.

MR. F. SMITH

Mr. Smith trained in colliery engineering with the Butterley Company, Limited, Derby. Following nationalization he was for some time enginewright at Denby Hall Colliery before being appointed sub-Area mechanical engineer of the Shipley group, No. 5 Area, East Midlands Division. He transferred to mechanization in 1951 and for over two years was Area mechanization engineer in the No. 5 (Mid-West Durham) Area. He was appointed to No. 8 Area, North-Eastern Division in December, 1953.

Sheffield University has appointed Mr. P. L. START Lecturer in Fuel Technology and Chemical Engineering, and Dr. J. M. WEST Lecturer in Metallurgy.

Senior lecturer in mechanical engineering at Lincoln Technical College, Mr. G. P. WILSON has now been appointed principal of the mechanical engineering department of the college.

The industrial division of Wakefield-Dick Industrial Oils, Limited, a member of the Castrol group of companies, has appointed Mr. P. H. CRIPPS as regional sales manager for London and the Home Counties.

Mr. H. A. ANDREWS has been appointed general manager of Power Auxiliaries, Limited, member company of the Plessey Group specializing in the manufacture of seamless flexible, metallic hose. Mr. Andrews joined the Plessey Company, Limited, in 1939.

Mr. ROGER PANE has been appointed assistant sales manager of the "Coalite" division of Coalite & Chemical Products, Limited. Previously a Southern representative on the firm's sales staff for some years, Mr. Pane's post-war career has centred entirely on the coal and "Coalite" distribution trade.

Mr. G. STEPNEY has been appointed assistant manager at Glapwell Colliery (Derbyshire). He began his mining career during the war and was appointed deputy and later overman at Langwith Colliery (Derbyshire). He then transferred to Glapwell as back-shift undermanager and for the past three years has been undermanager at Whitwell Colliery.

Mr. H. WALKDEN has been appointed manager for the Far East and Australasia for the Cementation Company, Limited, group. At the end of the month he will relinquish his appointment as general manager for India, Pakistan, and Ceylon. Mr. W. J. GREIG will become manager of the Indian branch and Mr. P. MASSARIK, the Middle East general manager, will control the Pakistan branch.

Mr. A. STEPHENS has rejoined Honeywell Controls, Limited, as senior flow engineer at the company's Greenford (Middx) head office. Mr. Stephens has worked with Humphreys & Glasgow, Limited, on the Chesterfield underground gasification project, George Kent, Limited, and Electroflow Meters Company, Limited. Mr. R. W. H. VIVIAN, who has been appointed to specialize on application engineering using the company's electric miniature instrumentation, will shortly leave for a brief study of US experience in this field. Mr. E. S. MILK has been appointed manager of industrial and scientific export sales.

Consultant to the heavy plant division of Associated Electrical Industries, Limited, is a new appointment for Mr. R. R. HUITSON, who is to undertake special duties in connection with the promotion of business in centrifugal compressors and allied apparatus. Mr. Huitson joined the staff of the British Thomson-Houston Company, Limited (now AEI (Rugby), Limited), in 1924 and for a time was associated with the development of the Whittle jet engine. Mr. T. E. ADAMS, previously chief engineer of the nuclear auxiliaries department, AEI turbine-generator division, has been appointed to succeed Mr. Huitson. He joined BTH in 1936 and has since been engaged principally on the development of gas turbines. He was also associated with the design of the Whittle jet engine.

New Editor for *Foundry Trade Journal*

AFTER nearly 40 years Mr. V. C. Faulkner has relinquished the editorship of our sister publication, the *Foundry Trade Journal*. One of the pioneers of the organization of the foundry industry, he is a past president of the Institute of British Foundrymen and an Oliver Stubbs Medallist. He also played a prominent part in the formation of the International Committee of Foundry Technical Associations and was its president in 1948.

Mr. Faulkner is succeeded by Mr. A. R. Parkes, who for the past 13 years has been the journal's assistant editor. Prior to 1947 Mr. Parkes was actively associated with the industry, particularly on the metallurgical side, both in this country and in India. He is senior vice-president and secretary of the London branch of the IBF, a member of the institute's general council, and serves on a number of its committees.

MORGAN CRUCIBLE VENTURE WITH BRITISH BELTING

NEGOTIATIONS are now well advanced by the Morgan Crucible Company, Limited, to form a joint company with British Belting & Asbestos, Limited. For some time, it is stated, the directors have been considering how the group's interests in the market for sintered metal friction materials could best be developed in the motor vehicle, machine-tool and earth-moving equipment industries. The new company will make such markets its first concern.

Regarding expansion outside the UK, steps have been taken in Belgium to acquire new premises to house growing activities, and further expansion of French activities is being considered. The board has also decided that the policy of decentralization should be carried to its logical conclusion in the near future.

Dorman Long Project

FOR GREATER STEELMAKING CAPACITY

PLANS to spend £6,800,000 for improving efficiency further and increasing iron and steel making capacity were announced on Wednesday by Dorman Long (Steel), Limited, which last year completed its £60,000,000 post-war development programme. The Iron and Steel Board has approved proposals by the company to install a sixth 360-ton tilting open-hearth furnace and a third 600-ton mixer at the company's Lackenby steel plant. Facilities will be provided for the full application of tonnage oxygen steelmaking techniques to all open-hearth furnaces at Lackenby.

Approval has also been given to the building at the Clay Lane blast-furnace plant, Cleveland Works, of a third 27 ft. 6 in.-hearth blast furnace of 1,500 tons a day capacity. Total estimated capital expenditure is £6,819,000. Work on the developments will begin immediately and member companies of the Dorman Long group will be responsible for construction.

It is expected that the new units will be in operation by the end of 1961. Dorman Long ingot capacity will be raised to 2,600,000 tons a year by the developments, which are designed to provide sufficient ingot steel to allow full advantage to be gained from the increasing potential of the company's existing rolling mills.

Obsolete Sheet Steelworks to Close

OLD-TYPE sheet steelworks of the Gorse Galvanizing Company, Limited, at Dafen (Carmarthenshire), is to close in September. The firm, which is a subsidiary of Bynea Holdings, Limited, is one of two such concerns still operating in the Llanelly area. Mr. W. L. Tregoning, a director of Bynea Holdings, said the closure had been delayed to coincide with the start of new industrial enterprises at Llanelly so that there would be alternative employment opportunity for the 300 made redundant.

From an economic standpoint, he added, the closure would have been justified a year ago. A number of workers from the Gorse works will be found jobs at other companies within the group. Mr. Tregoning stressed that the long-term prospects of the other companies in the Bynea group remained "excellent."

Oxygen Plant for Italian Steelmaking

CONTRACT to build an oxygen plant—worth over £1,000,000—at the O. Sinigaglia steelworks of Cornigliano, Genoa, has been awarded to Air Products (Great Britain), Limited, in the face of strong competition. It will be the first to be built for an Italian company and will consist of two generating units, each capable of producing 190 tons of oxygen a day, and storage facilities for 560 tons of liquid oxygen and 420,000 cu. ft. of high pressure gaseous oxygen.

Cornigliano has experimented for several years in the intensive use of oxygen in open-hearth furnaces and the new plant is expected to increase output of its six open-hearth furnaces by 90 per cent.

Sales Increase by Metal Box

AN expanding demand for the group's products is forecast by Sir Robert Barlow, chairman of the Metal Box Company, Limited. The undertaking is already committed to a capital expenditure of £3,300,000, he states, and there are a number of new projects being examined which will carry the total expenditure in the next financial year over that in each of the last three years.

The factories are well equipped, research and engineering staff more experienced, and certain engineering developments of importance are reaching point of production, Sir Robert says. Income from sales and investments of the home and oversea groups expanded from £76,790,000 to £83,390,000 in 1959-60. Despite increased production by the group oversea, the value of direct exports was maintained at £2,665,000.

Sir Robert has been asked to assume in January the honorary position of president, and to continue for the present to serve as a director of the company and its oversea subsidiary. It is intended that Sir Harold Roxbee Cox shall become chairman of the company and of the Metal Box Company Overseas, Limited, on January 1.

A brochure, "Expansion and Diversification," describing developments by the company since the war, has been issued.

Oversea and Home Expansion Compatible Says Oldham Chairman

"THERE is a great call these days for more direct exports from Britain and for more investment in British manufacture overseas to overcome tariff barriers," members of the staff of Oldham & Son, Limited, battery manufacturers, etc., of Denton, Manchester, were told by the chairman, Mr. John Oldham, at the annual outing on Saturday. He said that for a firm of its size it had a good record in the way of direct exports and oversea manufacture, since 40 per cent. of the company's revenue was derived from that source.

Mr. Oldham said that he had been aware that when the company began to build-up its oversea manufacturing organization some years ago there had been a fear among some employees that work might be taken away from Denton. However, it was most significant that the organization at Denton had continued to grow steadily despite the rapid oversea growth.

Obituary

DR. J. B. SIMPSON

MAN who discovered the deposits of high-grade coal which added millions of tons to the resources of the Ayrshire coalfield died suddenly last week. He was Dr. John B. Simpson, formerly of the Geological Survey office of Edinburgh. He was 66. Educated at Nairn Academy and Aberdeen University Dr. Simpson was appointed to the Geological Survey in 1920. After early geological work on rock formations he turned his attention to the survey of the Ayrshire coalfield. It was his re-interpretation of the boring evidence which led to the discovery of the new deposits. He also carried out a survey of Scottish limestone and made an outstanding contribution to the research into glaciers and glacier formations.

Dr. Simpson retired from the Geological Survey in 1954 and in the same year the Edinburgh Geological Society awarded him its Clough Medal and the Geological Society of London awarded him its Lyall Medal for his outstanding contribution to science.

Mr. WILLIAM H. CHAPMAN, former undermanager at Dean and Chapter Colliery (Co. Durham), has died at the age of 69.

Mr. JOHN NORMAN CUMBERBIRCH, head clerk at Thorncliffe Colliery (Yorks) for 10 years and on the clerical staff for 36 years, who retired 28 years ago, has died at the age of 88.

The death has occurred of Mr. ROBERT DAVID WILLIAMS, technical advisor to the sales department of Coalite & Chemical Products, Limited, Bolsover (Derbyshire). He was 29.

Mr. JOHN FERGUS MORTON, a former general manager and director of Lithgows, Limited, shipbuilders and repairers, of Port Glasgow, died suddenly last week. He was 65. Mr. Morton retired from the company in 1945 after completing 35 years' service.

The death has occurred of Mr. ALFRED HENRY MALINSON, secretary and former joint managing director of R. Mallinson & Company, Limited, wire goods manufacturers, of Halifax. He was 68, and had been associated with the company for 50 years.

The death occurred last Friday of FRANCES, LADY RIVERDALE, widow of the first Lord Riverdale, the eminent Sheffield steelmaker and former chairman of Arthur Balfour & Company, Limited, who died in 1957. Lady Riverdale was the daughter of Mr. C. H. Bingham, who was partner with his brother, the late Sir John Bingham, in the Sheffield cutlery firm of Walker & Hall, Limited, and who was Master Cutler in 1894.

The death has occurred at the age of 68 of Mr. R. G. HEMPSON, formerly managing director of Wombwell Main Company, Limited, owners of Wombwell Main Colliery (Yorks) before nationalization. He was the father of Lady Roberts, wife of Sir Peter Roberts, MP, chairman of Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield, and a former Master Cutler. Mr. Hempson lived for much of his life in Spain, and for a number of years was honorary vice-consul in Cadiz.

MERSEY CABLE WORKS, LIMITED, was elected a member of the Cable Makers' Association on Friday last.

Directors Urge More UK-Soviet Trade

LONG-TERM, large-scale expansion of Anglo-Soviet trade is to be recommended by the British Institute of Directors' mission to Moscow, which returned to London on Tuesday. This was stated by Mr. Harold Drayton, head of the mission, who said he hoped that Britain would be able to buy Soviet ores and other raw materials in exchange for British manufactured goods. Trade would be expanded in goods now being exchanged, and "new ground" would also be broken.

Mr. Drayton said it was not in the present Seven-Year-Plan, which ends in 1965, that the mission was interested, but it was of great importance if, under the Soviet 20-Year-Plan, definite arrangements could be made for the supply of products over a long period of 10 to 20 years.

One of the barriers up till now was that both sides were not quite sure how to get in touch with each other, but the British industrial exhibition of the type to be organized in Moscow next year was one of the best forms of promoting contact. A Soviet delegation had been invited to visit the UK in the autumn, and "by then we will have made such progress in our discussions as to establish a basis for long-term trade between our two countries."

Members of the mission included:—Sir George Binney, a director of the United Steel Companies, Limited, and a number of other companies; Sir Percy Lister, chairman of R. A. Lister & Company, Limited, and Blackstone & Company, Limited, and a member of the Iron and Steel Board; Sir Andrew McTaggart, chairman of Balfour, Beatty & Company, Limited, and chairman and managing director of the Power Securities Corporation, Limited, and Mr. J. B. Scott, sales director of Crompton Parkinson, Limited, and a director of Crompton Parkinson subsidiaries.

Investigation into Welsh Colliery Explosion Begins

FIRST fact-finding team went underground at Arrael Griffin Colliery, Six Bells, Abertillery (Mon), on Thursday of last week to investigate "W" district where 45 men died following an explosion on Tuesday of last week. The team included Mr. C. Leigh, HM Inspector of Mines, and Mr. Lister Walker, general manager of the No. 6 (Monmouthshire) Area, South-Western Divisional Coal Board.

Many thousands of miners, union and Coal Board officials, representatives of local authorities, relatives and friends, attended the funeral services on Saturday of 26 of the men killed.

The Minister of Power, Mr. Richard Wood, has received messages of sympathy from Herr Ludwig Erhard, Minister of Economics in the Federal Republic of Germany, M. Georges Berthoin, Chargé d'Affaires to the UK delegation of the High Authority of the European Coal and Steel Community, and M. Jan Mitrega, Polish Minister of Coal and Power.

The Lord Mayor of Cardiff, the Mayor of Newport, Monmouthshire County Council, Abertillery UDC, and the Western Mail & Echo, Limited, have combined in organizing a fund for the bereaved families. Donations may be sent to the Hon. Treasurer, Six Bells Colliery Disaster Fund, Western Mail & Echo, Limited, St. Mary Street, Cardiff. Up to Wednesday £16,356 had already been received.

Changes in Store

MR. ROBENS ON FUTURE OF COAL INDUSTRY

"I HAVE not taken over to preside over the death rites of this industry." Mr. Alfred Robens, chairman-designate of the National Coal Board, made this point emphatically in a recorded commercial television interview transmitted from Newcastle-upon-Tyne on Monday. He foresaw, however, that there would be some form of progressive administrative decentralization, followed—perhaps after two or three years—by a statutory reorganization of the industry on the lines of the gas and electricity industries.

Mr. Robens reminded his audience that for 20 years "we have not been selling coal in this country. We have produced all we possibly can and industry wanted more. Now the whole situation has changed." The coal industry was moving down rather than up and therefore it seemed to him that the great task was to sell the coal it was producing and to produce the kind of coal that would sell. That might require quite big changes in the industry.

Under the reorganization that he felt might have to come about, the Coal Board would retain responsibility for such matters as wage negotiations, finance and investment, and the administration of welfare services. It would be responsible for ensuring that the divisions played their part in the overall plan.

Most of the detailed decision, Mr. Robens said, would devolve on the divisions. He, personally, was in favour of decentralization, especially in view of the overriding importance today of maximum sales as opposed to maximum production. One of the main objects of decentralization would be to encourage more aggressive salesmanship in the divisions. He indicated that he was thinking in terms of stabilizing output nationally at about 200,000,000 tons.

Mineworkers' Pension Fund Now Over £52,000,000

MINEWORKERS' Pension Fund increased by £5,770,000 to £52,230,000 in the year to April 5, 1960, according to the annual reports and accounts published on Tuesday. Membership of the scheme rose to 96 per cent. at the end of the year, compared with 92 per cent. in the previous year. Members' contributions for the year amounted to £2,106,622 and National Coal Board contributions were £6,893,994. Investment income came to £2,755,391, compared with £2,254,057 last year.

At the beginning of April 113,152 pensions (weekly total amount £99,290) were being paid and in the year 42,577 lump sum benefits became payable, amounting to £923,564.

The annual reports of the Industrial Injuries Supplementary Benefits and Special Fatal Accident Schemes were published at the same time. At December 31, 1959, the fund of the Supplementary Scheme was £14,500,000 and benefits paid were £3,511,901.

Argentina Independent of British Coal by 1961

SPEAKING at a Press conference at the Argentine Embassy on Monday, Dr. Arturo Frondizi, President of the Argentine Republic, said that he believed it was necessary for Britain to be ready to change the type of exports she had been sending to his country. "In the past Britain has sent coal and oil and we have sent back meat and wheat," he said, and went on: "We should like to continue sending meat and wheat to Britain, but by 1961 we expect to be independent, for the most part, of fuel."

He believed there were great opportunities for British trade with Argentina and it was important that Britain should take her place along with the United States and the countries of the Common Market which were also interested in selling machinery and capital goods to the Argentine.

The following day at a luncheon given in his honour by the Anglo-Argentine Society, Dr. Frondizi asked for an expansion of British collaboration in Argentina's national development with a more intensive long-term and short-term credit policy. Thermal and nuclear power stations, transport—especially air, river, and sea—and iron and steel were the basic activities in which Britain could offer significant aid to Argentina, he said.

Gap in Safety Curtain Led to Pit Death

MINER who was killed in a shot-firing incident at Langwith Colliery (Derbyshire) last year was struck by debris which flew through an 18-in. gap in a safety curtain, said the Nottingham District coroner, Mr. C. A. Mack, at a resumed inquest at Mansfield. The jury returned an open verdict on Mr. Stanley Fowler (47), after being told by the coroner that investigation had shown some non-compliance with regulations.

The coroner said that the colliery deputy concerned with the firing of two shots placed in boreholes in the coal face had admitted that he should have seen that the safety curtain was properly closed, and that Mr. Fowler and another man with him were under cover. Instead, he seemed to have assumed that Mr. Fowler, an experienced workman, had done what was necessary. "Action has been taken against certain individuals, and we are hoping a repetition of this accident will not occur," he said.

Personal

Mr. T. B. Adkins Retires from Ore Mining

RETIREMENT of Mr. T. B. Adkins as general manager of the ore-mining branch of the United Steel Companies, Limited, which is announced elsewhere in this issue, was marked by a presentation by his successor, Mr. D. R. Ward Jones, on behalf of colleagues. Mr. Adkins began work at Rother Vale Collieries, Limited, in 1904 at the age of 14. By 23 he qualified as a colliery manager and four years later he became manager of Orgreave Colliery (Yorks). He transferred to Treeton Colliery, was agent at Thurcroft In 1922, and became chief agent for all three pits in Rother Vale in 1929.

When, in 1937, the collieries were taken over by the United Steel Companies, Limited, Mr. Adkins played an active role in the expansion of the company's colliery interests. In 1944 he was appointed by the Minister of Power as production manager over a large group of south Yorkshire collieries. On vesting date he became manager of the ore-mining branch of United Steel and under his management underground mining was introduced at the Dragonby Mine, near Scunthorpe, in 1951.

Dr. P. H. CALDERBANK has been appointed to the Chair of Chemical Technology at the University of Edinburgh.

Assistant manager of the electrical department of Harland & Wolff, Limited, Belfast, Mr. W. R. BENNETT has retired after 41 years' service.

Mr. REGINALD BARNES, blast-furnace superintendent with the South Durham Steel & Iron Company, Limited, West Hartlepool, has retired.

Institute of British Foundrymen has elected Mr. G. SHOTTON, joint managing director of Shotton Bros., Limited, Oldbury (Worcs), as president.

Presentation was made recently to Mr. GEORGE WALKER, for the past 12 years manager of Westhorpe Colliery (Derbyshire), on his retirement.

After 40 years in the mining industry, Mr. R. V. HAWKES, manager of the National Coal Board Central Workshops at Barnsley (Yorks), has retired.

Among the first Fellows of the new St. Catherine's College, Oxford is Dr. J. W. MARTIN. He has been appointed Goldsmiths' Company Fellow in Metallurgy.

Presentation was made to Mr. JAMES J. SHAW on his retirement recently after 51 years—40 years as foreman—with Callendar Abbots & Dobbie Forbes, Limited, Falkirk.

The Minister of Power has appointed Mr. R. D. HOSKIN, power services engineer to J. S. Fry & Sons, Limited, Bristol, to be a member of the Industrial Coal Consumers' Council.

After 51 years with Dorman, Long & Company, Limited, and its predecessor, Bolckow Vaughan & Company, Limited, Mr. HORACE KING, has retired. For the past seven years he has been works accountant.

After 34 years' service with the company, Mr. J. J. GRACIE, a director of the General Electric Company, Limited, and general manager of its Witton engineering works, is to retire at the end of the year at his own request.

Former Mayor of Rotherham, Ald. MAURICE YOUNG, was one of three employees of the Steel, Peech & Tozer branch of United Steel Companies, Limited, who received presentations marking their retirement last week. He became works librarian in 1953, and had been with United Steel for over 40 years. Others to receive awards were Mr. DAVID MANTERFIELD, chief chemist, and Mr. A. STARK, mechanical maintenance superintendent of Steel, Peech & Tozer.

After 54 years' association with Hawthorn Leslie (Shipbuilders), Limited, Hebburn-on-Tyne (Co. Durham), Mr. THOMAS H. SMITH, commercial manager, has retired. He joined the company at the age of 13 and was secretary before becoming commercial manager.

Honorary degrees of D.Sc. have been awarded by Durham University to Prof. E. S. HILLS, FRS, Professor of Geology and Mineralogy at Melbourne University, and by Hull University to Dr. R. HOLROYD, FRS, deputy chairman of Imperial Chemical Industries, Limited.

Mr. OMER G. VOSS, who recently returned to the United States after a period of six years as managing director of the International Harvester Company of Great Britain, Limited, has been appointed president of International Harvester in Canada, one of the largest IH subsidiaries.

Seventh in the series of annual Fawley Foundation Lectures at Southampton University will be given this year on November 10 by Sir ALEXANDER FLECK, former chairman of Imperial Chemical Industries, Limited. Title of his address: "Science and Industry: A Blend with the Humanities."

After a lifetime in the coal carbonization industry, Mr. EWART THOMPSON, manager of the Trimdon Grange Coking Plant (Co. Durham), has retired. At one time manager of both the Shotton and Horden plants in the county, he was appointed manager of the new Hawthorn combined mine in 1958 but had to resign last year owing to ill health.

Presentation was made recently to Mr. T. W. F. BOLLAND, general manager of the Doncaster Wire Mills of British Ropes, Limited, on his retirement. He has been associated with the company for 41 years, joining the Doncaster Wire Company, a member of the British Ropes group, in 1919. Before the war he was company representative in the Birmingham area.

Capitalization of Reserves by Coalite & Chemical

INCREASE of the issued capital, to bring it more into line with that actually employed, is recommended by the directors of Coalite & Chemical Products, Limited. It is proposed that the share premium account of £66,904, together with £897,471 from the general reserve account, making a total of £964,375 should be capitalized, and that this amount should be applied in the issue of one new 2s. stock units for each two units held.

There is now a tendency for the prices of the materials the company buys to increase and for shortages to develop, says Cmdr. C. Buist, chairman, in his annual review. This, together with other cost changes, may make it difficult to limit changes in the works price of "Coalite" to those necessary to cover national increases in the price of coal, as has been done in the past.

Mr. Otto F. Reichwald has joined the board of Daniel Adamson & Company, Limited, and will become full-time managing director later in the year. Mr. J. E. Roach has retired as managing director and from the board.

COAL INDUSTRY IN EUROPE

Unprecedented Rise in Stocks

GRAVITY of the coal situation in Europe caused by the excess of supply over demand is the chief theme treated in the annual report of the coal committee of the Organization for European Economic Co-operation, published last week. Entitled "The Coal Industry in Europe," it reveals that in 1958 and 1959 the coal consumption of OEEC members fell by 62,000,000 tons, or approximately 6 per cent.

Today's glut on the coal market contrasts sharply with the acute shortages in Europe between 1945 and 1957, which led experts to believe that in Western Europe over the next 20 years there would be a steady increase in coal consumption. The situation has drastically changed, however, and there is now not only excess of supply over demand but an unprecedented accumulation of pithead stocks, which have risen from 16,000,000 tons in December, 1957, to 68,000,000 tons in December, 1959.

"This figure in itself is enough to demonstrate the gravity of the crisis now facing the industry," the report states, which adds that the present recession is in some measure due to structural factors, although associated cyclical factors connected with the 1958 recession and exceptional climatic conditions have helped. The committee takes the view that in 1960 demand is likely to be stable at the present figure.

Stocks Rise in May

The report adds: "As regards the probable trend up to 1965, there is no reason to believe that demand for coal will fall as compared with 1959. Industrial activity is already picking up after the recent lull, and if this expansion continues, as may be hoped, the level of industrial activity in 1965 can be expected to be appreciably higher, which would entail a higher demand for energy in one form or another.

"If coal is produced at acceptable, competitive prices, in a market of fair competition it will continue to command large markets in the coming years. The watchword must therefore be efficient production (rather than production at any price) and concentration on the more profitable mines."

In May, stocks rose only slightly after the substantial increases in March and April. Provisional figures show stocks at the end of the month at 32,009,000 metric tons, against 31,921,000 tons at the end of April, and 31,193,000 tons at the beginning of the year. The whole of the May increase occurred in France, whose additions to pithead stocks this year have been far greater than any other Community country.

Stocks of coke at coking plants continued to decline in May, and by the end of the month were down to 7,140,000 metric tons, from 7,399,000 tons a month earlier, and 8,569,000 tons at the beginning of the year. Stocks of coal held by major consumers rose slightly in March—the latest date for which statistics are available—to reach 16,130,000 metric tons, compared with 15,993,000 tons at the end of February, 16,867,000 tons at the beginning of the year and 19,298,000 tons at the end of May, 1959.

The ECSC High Authority has prolonged its authorization of the present three sales organizations for Ruhr coal for a transition period. This is in view of legal action which Ruhr producers are now likely to undertake in the Community's Court of Justice to clarify the interpretation of Article 65 of the ECSC Treaty, which the Authority has invoked against the producers' wish to create a single coal sales organization.

At its meeting last week the Authority rejected a revised application for the authorization of a selling agency which would have included almost all the Ruhr producers. The latter have made it known that, should their proposals be rejected, they would introduce a case before the Court seeking to declare invalid the Authority's rejection of the proposals for a single selling agency.

Criticism has been directed against the Authority by the ATIC association of French coal importers, whose activities in hindering coal imports into France are under consideration by the Authority. At the annual meeting of ATIC, its president, M. Jean Picard, defended imports of oversea coal by pointing out it was at present very cheap and that every means should be used to keep industrial power costs down. It was astonishing, he said, that the Authority was trying to cut imports of oversea coal now that it was cheap, while, when it was dear, it had encouraged its import.

The French Government has issued details of its plan for the reorganization of the national coal industry. French stocks now total 12,406,000 metric tons against 9,855,000 tons a year ago. Production is to be cut so that the 1959 output level of 60,000,000 tons will by 1965 have fallen to only 53,000 000 tons. The closure of uneconomic pits in Lothringia and in southern and central France is likely, and the government is expected to reduce imports from the Saar pits.

Restrictive Practices Orders

THE Restrictive Practices Court made agreed orders on Tuesday declaring that restrictions contained in the agreements of the British Bath Manufacturers' Association, Limited, the United Kingdom Glycerine Producers' Association, and the Association of Hard Fibre Rope Manufacturers' were contrary to the public interest.

The associations, having terminated their agreements, which mainly related to price fixing, and having given undertakings not to give effect to or enforce the agreements, the Registrar did not pursue his applications for injunctions.

An application to fix October 4 as the date for hearing the case concerning an agreement among members of the Association of Steel Drum Manufacturers was allowed.

NEW POSTS AT RTB's SPENCER WORKS

FURTHER senior appointments to the production and administration staffs of the Spencer Works, now under construction at Llanwern, near Newport (Mon) are announced by Richard Thomas & Baldwins, Limited. They are Mr. R. A. Lake as chief engineer, Mr. A. J. Burgess as iron-making manager, Mr. D. Gray as ore-preparation and sinter-plant manager, and Mr. D. J. Jones as cold mill manager.

Mr. Lake began his career in the Shelton Iron & Steel Company, Limited, and after experience in electrical plant manufacture with engineering consultants to the steel industry, and in other major steel concerns, he joined RTB in 1954 as chief engineer of its Redbourn Works at Scunthorpe (Lincs). In 1958 he moved to the Ebbw Vale works as chief engineer, and was subsequently appointed assistant general manager (engineering).

Mr. Burgess joined Guest Keen Baldwins, Limited, at Port Talbot in 1933, working in various production departments. After the war he became a blast-furnace foreman with the Steel Company of Wales, Limited. He later became manager of the department. Last November he was seconded by the Steel Company of Wales to the steel project at Durgapur, India, for blowing-in and commissioning the new blast furnace plant. He is a member of the blast-furnace practice and productivity committee of the British Iron and Steel Research Association.

In 1956, after 14 years with the Appleby-Frodingham Steel Company, branch of the United Steel Companies, Limited, Mr. Gray rose to the position of shift manager, ore preparation plant. He later joined the Guest Keen Iron & Steel Company, Limited, at Cardiff as manager of its sinter plant. He is a member of the sinter committee of the British Iron and Steel Research Association.

Mr. Jones, who moves to the Spencer Works from Ebbw Vale, began work in the sheet mills of the old Ebbw Vale plant, and in 1936 transferred to the staff of the West Wales section of the then Richard Thomas Company, Limited. He returned to Ebbw Vale in 1939 as general foreman in the cold-reduction mills and was successively promoted mill superintendent (1951), assistant manager (1955), deputy manager (1957), and manager (1958) of the cold sheet department. He has made study visits to the USA and Europe.

MR. R. A. LAKE

MR. A. J. BURGESS

MR. D. GRAY

MR. D. J. JONES

Large New Iron Ore Source Opened in West Germany

LARGE and unusual new source of iron ore is being opened up this month in North Germany. Geologists have pinpointed an area 25 miles square near Nienburg in heathland south of Bremen, which it is expected will supply west German blast furnaces for many decades. Its capacity is estimated at between 300,000,000 and 500,000,000 tons of high-grade ore.

Unusual feature of the new iron deposits is that they lie nearly 4,000 ft. below the surface of the earth and are under an 800-ft. deep layer of dangerous wet sand. In order to work the deposits engineers are having to freeze the water in the sand through which the bore shafts have to pass, to stop the ground subsiding or the water flooding the workings below. It is estimated that it will take 10 to 12 years before the deposits can be worked at full capacity.

More Students Studying For Technology Diploma

MORE students are studying for the new diploma in technology, and a total of 163 students, including one woman, have now been awarded the diploma which is equal in standing to an honours degree at a university. This is stated in the annual report of the National Council for Technological Awards, published recently.

There are now 95 recognized courses at 23 colleges leading to the award. Nearly 4,000 students, including 84 women, have been enrolled. Of all students registered, 3,442 are studying by the "sandwich" course method entailing alternate periods in industry and at college.

Number of students attending the first year of courses continued to increase. The number now enrolled in the first year is 1,558.

BISRA JUNIOR STEELMAKING CONFERENCE

Oxygen in Open-hearth Steelmaking

Possible Increase in UK Production By Its Use

There was a record attendance of some 200 delegates at the 14th Junior Steelmaking Conference, held at Scarborough on June 22 and 23. Papers were presented on "The Use of Oxygen in Open-hearth Furnaces," "Hot-topping," and "The Deoxidation of Steel," and "The Study of the Human Factor in the Steel Industry." The first session opened with a survey of the increasing use of oxygen in open-hearth practice in this country and an assessment of the gains that would accrue from its more intensive use. This survey, carried out by BISRA on behalf of the industry, was presented by Dr. J. Pearson, assistant director of the association. A report of this is given below.

INTRODUCTION

SINCE the war steel companies have considered the possibility of using gaseous oxygen to speed up their open-hearth steelmaking operations. Many have experimented with its use and in a number of cases the beneficial results have been sufficiently convincing to warrant its use as routine practice. This report was prepared originally several months ago, and, as much development has been carried out in recent months, it must not be regarded as fully up to date.

The development of oxygen usage in this country is reviewed under three headings:—(1) Oxygen for carbon removal; (2) oxygen as an aid to combustion, and (3) oxygen for the pre-refining of hot metal.

The salient features of practices at those companies reported to be employing them regularly are given in the following sections and more details of these and of trials are in tabular form. The changes brought about by the use of oxygen are broadly in line with those reported from the USA, Germany, Russia, and Japan (see J.I.S.I., 1959, May, 55-60; July, 201-215; Radex Rundschau, 1959, May, 533-545), some information on which is included in the tables.

The question of fume evolution during the use of oxygen has not been covered in this paper, but it must be emphasized that it has been and continues to be closely examined by the companies contemplating the use of oxygen.

Oxygen for Carbon Removal

The removal of carbon after melt-out in the open-hearth furnace is a lengthy process because it depends on the transfer of oxygen from the furnace gases and ore additions, via the slag, to the metal. The time taken for carbon removal can be reduced considerably by applying oxygen through lances or guns to the bath. Removing carbon in this way not only reduces the refining time and thus increases production rate but also reduces fuel consumption because during lancing or jetting the furnace can be run at a low fuel input rate.

APPLEBY-FRODINGHAM STEEL COMPANY: APPLEBY MELTING SHOP. Appleby first used oxygen to assist carbon removal in 1950-51 on 290-ton charges in tilting furnaces. After the addition of hot metal, 380 cu. ft. of oxygen per ton were blown through a lance in 2 to 3 hr. The tap-to-tap time was reduced from the 20 hr. of normal practice to 17 hr. and output rate increased by 17 per cent. One hour could be taken off refining time when making low-carbon steel by blowing 50 cu. ft. per ton in 30 min.

RICHARD THOMAS & BALDWINS, LIMITED: REDBOURN WORKS.—Redbourn experimented with carbon removal in 1953 in fixed furnaces tapping 120 tons, blowing 100 cu. ft./ton through a lance in about 1 hr. The carbon content was approximately 0.22 per cent. at start of blowing and was down to 0.024 per cent. at tapping. The amount of fuel used during the period was one quarter of normal and the production rate increased by some 12 per cent. In 1955 Redbourn instituted a standard practice of adding ore to the bath when 80 cu. ft./ton of oxygen were being blown in 30 min. and achieved the same reduction of carbon as in the previous process. The iron in the tapping slag when using ore alone was up to 30 per cent., but with oxygen and ore the iron in the slag was of the order of 20 per cent. at tap.

STEEL COMPANY OF WALES, LIMITED: ABBEY MELTING SHOP.—In 1954 Abbey first used a roof-mounted oxygen gun in a 200-ton fixed furnace blowing 160-210 cu. ft./ton for removing carbon from 0.4 per cent. C. or less to 0.045 per cent. If oxygen jetting was started at 0.4 per cent. C., the duration of the blow was about 60 min. as against a refining time with ore of 150 min., and when starting at 0.1 per cent. C., jetting was required for 30 min., as compared with a normal 70 min. with ore alone. Fettling time was reduced by 20 min. on average, so that the net saving of time was 1 to

2 hr., corresponding to increases in output rates of 8 to 16 per cent. Because of the lower fuel input rate during jetting, 100-150 gal. of oil could be saved per cast. The iron in the tapping slag was lower (by 1 per cent.) and the oxygen-blown steel was of a better quality than with the standard steelmaking practice.

STEEL COMPANY OF WALES, LIMITED, MARGAM MELTING SHOP.—In 1957 Margam installed a specially designed gun in the back wall of 100-ton furnaces for oxygen blowing. In the practice at this shop the blowing time varies from 20 to 50 min. using 100-240 cu. ft./ton and this is claimed to reduce refining time by 30 and 75 min. respectively, for low-carbon rimming and silicon transformer steels. The carbon content could be reduced to 0.025 per cent.

Oxygen as an Aid to Combustion

While reduction in refining time is desirable, it is equally important that the melting of scrap should be speeded up and this can be achieved by increased rates of heat transfer. The employment of higher fuel rates during the charging and melting period is theoretically possible because the furnace roof does not reach full working temperature while there is scrap to act as a heat sink, but with many furnaces the flues and checker systems are not adequate to cope with the increased volumes of waste gas.

Oxygen enrichment of combustion air can overcome this disadvantage because, unlike air, oxygen is not accompanied by four times its own volume of nitrogen. In addition, the use of oxygen reduces the amount of heat removed from the furnace by the waste gases and is thus conductive to better thermal efficiency and lower fuel consumption. Fuel flames burning in oxygen-enriched air are hotter than in air alone and this leads to higher rates of heat transfer by radiation and convection. Oxygen-enriched air thus makes possible an increased heat release in the furnace chamber at a higher potential and if restricted to the charging and melting period should have no deleterious effects on refractory wear. Full advantage cannot be gained, however, if the scrap-charging facilities are not adequate.

The oxygen is usually fed close to the burner, though it is sometimes more convenient to add it in the uptakes or air flutes. Work on the model furnace at the laboratories of the steelmaking division of BISRA has indicated that it is immaterial which way the oxygen is supplied. The amounts used are such as to increase the oxygen content from the normal 21 per cent. to about 25 per cent. Practical results have shown a saving of fuel as well as of time and, as an added bonus, there is a reduced pick-up of sulphur from the flame.

APPLEBY-FRODINGHAM STEEL COMPANY: APPLEBY MELTING SHOP.—Since 1952 the Appleby melting shop has used oxygen up to 210 cu. ft./ton for flame enrichment during scrap charging. Numerous comparative trials have been carried out in which both oxygen supply rate and furnace charge have varied. The figures given in the tables refer to two such trial runs. In these it will be seen that using oxygen for up to about 2 hr. at 163 and 210 cu. ft./ton leads to 6 to 8 per cent. increase in output rates and saves some 3-4 therms/ton, though the normal saving would appear to be slightly lower than this. Standard practice is to use some 25,000 cu. ft./hr. during scrap charging. Similar advantages are obtained at the Frodingham shop.

CONSETT IRON COMPANY, LIMITED.—Consett has used oxygen for flame enrichment since 1955, mainly on "maximum scrap" charges (120 tons scrap, 50 tons hot metal, 3¼ tons cold metal). Introducing 700-900 cu. ft/ton at the burner in up to 4 hr. with a 22 per cent. increase in fuel rate saves some 15 per cent. of fuel and increases output rate by 12 to 20 per cent. as compared with ordinary practice using air alone for combustion; tap-to-tap time is shortened by 1¼ hr.

DORMAN LONG (STEEL), LIMITED: REDCAR.—Redcar has increased its ton/hr. rate by 15 to 18 per cent. by raising fuel input rate and adding about 720 cu. ft. of oxygen per ton at the burners over a period of 4 hr. During trials at this plant it was shown that the production rate could be increased by 36 per cent. if the oxygen supply rate were increased (31,700 cu. ft./hr. for 2 hr. instead of 20,000 cu. ft./hr. for 4 hr.), with a 22 per cent. increase in fuel input rate, but, because of danger of damage to refractories, this has not been adopted as routine practice. However, the use of all-basic construction might enable this to be achieved.

Oxygen for Pre-refining Hot Metal

The above two sections have indicated how oxygen may be used to accelerate chemical and physical stages of the conventional open-hearth process. Pre-refining of hot metal serves a different purpose, *viz.*, that of reducing the amount of chemical work to be done in the furnace. Pre-refining should not be carried too far since certain concentrations of carbon and silicon are required to enable the charge to be worked properly during the subsequent refining to steel, but removal of some silicon and phosphorus before the metal enters the furnace confers several advantages in the refining process provided the resultant slag is skimmed off before the metal is charged to the furnace. Since these elements are removed by oxidation (as with carbon by the slow transfer of oxygen, via the slag, from furnaces gases and iron oxides), the less there is of them, the quicker will specification levels be reached.

The amount of lime and ore to be charged and the amount of heat required to melt them will also be reduced. The resultant slag volume and thickness will be lowered and this will improve heat transfer from the flame. The reduced bulk of slag and its less acid character lead to less bank erosion and shorter fettling times. Another potent advantage is that the composition of the hot metal

fed to the furnace may be kept uniform, for it is often the variability of the charge that introduces delays during working.

Pre-refining may be carried out simply, by injecting oxygen into the metal through consumable or water-cooled lances after the addition of lime to combine with the silica and phosphorus pentoxide produced. At present, pre-refining is generally carried out in ladles and confined to the removal of silicon and this is effected without materially changing the carbon or phosphorus content. If more lime is added (preferably as powder suspended in the oxygen) and the process prolonged somewhat, it is possible to remove silicon and phosphorus while still retaining sufficient carbon (up to 2 per cent.).

The oxidation of silicon and phosphorus during pre-refining produces a temperature rise of up to 250 deg. C., and while this in itself is not a nett thermal gain, since these elements would produce some heat during normal refining in the furnace, it does reduce the time during which furnace heat losses can occur and so leads to reduced fuel consumption.

The results quoted in Table 3 do not produce much evidence of the benefits to be gained from pre-refining, but are given to show how the metallurgical load may be reduced.

BRYMBO STEEL WORKS, LIMITED.—The first experiments in this country were carried out at Brymbo Steel Works from 1948 onwards by lancing oxygen into blast-furnace metal contained in a ladle, which was eventually basic-lined. This was established as standard practice in 1952 and further developed. Metal is now refined in a specially designed vessel, blowing 1,000 cu. ft./ ton of metal into 22 tons in 1 to 1¼ hr. The charge is deslagged about half-way through this period. The process removes all but a trace of silicon, phosphorus to 0.1 per cent. or less, and the carbon content of 1.5 to 2.0 per cent. This treated metal is now used in electric furnaces, but previous experiences showed that by its use open-hearth production could be increased by at least 30 per cent.

SKINNINGROVE IRON COMPANY, LIMITED.—The blowing of oxygen into blast-furnace metal for desiliconization started at Skinningrove in 1952 and has been used in the process for routine operation since 1954. Oxygen (250 cu. ft./ton) is blown into 20 tons of metal in a basic-lined ladle during a period of 20 min. This brings down the silicon content to 0.5 per cent. and raises the metal temperature by 100 to 130 deg. C. An increase in output of the open-hearth furnace shop of 10 per cent. results. With a longer blowing time the silicon content can be reduced further and the gains thereby improved. The rate of metal production at the blast furnace does not, however, allow this to be done in the present works' layout.

RICHARD THOMAS & BALDWINS, LIMITED: REDBOURN.—Redbourn has desiliconized blast-furnace metal in 60-ton batches since 1956, reducing the silicon content of 0.7 to 1.3 per cent. to a standard 0.4 per cent. At this works, as mentioned above, oxygen is used for carbon removal, air enrichment and desiliconizing, the gain in output rate of the open-hearth furnaces being 50 per cent., of which some 20 per cent. is attributed to the desiliconizing.

Development of the Application of Oxygen at Appleby-Frodingham

Experiments with the use of oxygen in tilting open-hearth furnaces were started in 1950. By 1957 the following techniques had been developed:—

(*a*) A 300-ton tilting furnace with basic roof was charged with 204 tons of hot metal. Oxygen (2,195 cu. ft./ton) was fed into the furnace, 1,630 cu. ft./ton during a period of 5 hr. to burn the carbon monoxide evolved from the bath and 565 cu. ft./ton hand-lanced for a period of 3 hr. to work the heat. This method, on average, reduced the tap-to-tap time of 6.8 hr. and produced 30 tons of steel per hour. The fuel consumption was 15.5 therms/ton, as compared with the normal value of 45 to 48 therms.

(*b*) For the next series of trials the above technique was modified. Oxygen lancing was done through water-cooled retractable guns in the port ends of the furnace and the charge weight was reduced to just over two thirds of the normal practice. A charge of 219 tons could be ready for tapping in 5¼ hr., producing 42 ton/hr. by using 1,045 cu. ft./ton and reducing the fuel consumption to 9.5 therms/ton. Normal firing was carried out during charging of raw materials and while preparing the heat for tapping. As soon as all the hot metal had been charged, oxygen was jetted into the furnace for a period of more than 1 hr., depending on the carbon content. At the same time all the fuel was turned off and oxygen fed through the fuel burners to burn carbon monoxide.

(*c*) The Ajax Process: Early in 1958, a 300-ton tilting furnace was so rebuilt and modified to suit the use of oxygen that it would no longer be possible to operate it as a normal open-hearth furnace.

TABLE 1.—*Comparative Results Based on a Working Year* (*p. 338, J.I.S.I., April, 1959*).

—	Type of furnace.		
	Silica roof.	Basic roof.	Ajax.
Production per working week (tons)	2,889	3,210	4,316
Annual productivity divided by 52 weeks	2,600	2,889	3,623
Furnace availability (per cent.)	90	90	84
Ingot yield (per cent.)	90	90	87.2
Scrap, cwt./ton ingots	3.55	3.55	0.20
Molten metal, cwt./ton ingots	17.01	17.01	21.50
Oxides, cwt./ton ingots	2.23	2.23	1.58
Lime, cwt./ton ingots	0.21	0.21	0.53
Limestone, cwt./ton ingots	1.45	1.45	0.55
Dolomite, cwt./ton ingots	0.64	0.64	0.56
Oxygen, cu. ft./ton	160	160	1,380
Therms/ton	45	47	11

Production increase—Ajax over silica roof = 50 per cent.
Ajax over basic roof = 34 per cent.

TABLE 2.

—	Increase in output.	Blowing time.	Usage, cu. ft./ton.	Fuel saving.	Remarks.
Pre-refining	10–30 per cent.	20–90 min.	120–1,000	—	12–60 tons in ladles and special vessel
Aided combustion	6–36 per cent.	1½–4 hr.	160–1,000	7–25 per cent.	90–300 tons
Carbon removal	6–17 per cent.	½–1½ hr.	80–400	3–10 per cent.	Low-carbon steels
Ajax	34 per cent. 130 per cent.	4 hr.	1,380	74 per cent.	Combustion and refining

This is the Ajax furnace. Typical charges have been:—

(i) *Hot Metal, 220 tons:*—While charging the furnace with raw materials, ordinary fuel is burned with air plus 15,000 cu. ft./hr. of oxygen. After the addition of hot metal, 950 cu. ft./ton of oxygen is jetted into the furnace during a period of 4.4 hr., all fuel and combustion oxygen being turned off, but enough air being allowed through the regenerators to burn the evolved carbon monoxide. Normal firing is resumed when preparing to tap. This produces 33.8 ton/hr. in 6.5 hr. tap-to-tap time and uses 13 therms of fuel per ton.

(ii) *Hot Metal, 195 ton, scrap, 25 tons:*—Firing arrangements are similar to (i), but tap-to-tap time is 7.8 hr. and the output rate is 29 ton/hr.; the fuel input is 11 therms/ton.

During one year's operation of the Ajax process, the advantages have been most marked in that output has increased and ingot cost decreased. It is of interest that the total cost of fuel plus oxygen is only 43 per cent. of that of the normal fuel supply.

Table 1 compares production results for the Ajax as compared with normal tilting furnaces with silica and basic roofs.

The latest information indicates that the second Ajax furnace has made 5,092 tons in one week, as compared with 2,232 tons before conversion, an increase of approximately 130 per cent.

Overall Results

The benefits to be obtained from the use of oxygen in open-hearth furnaces may be summarized as in Table 2. It is emphasized that since

TABLE 3.—*Carbon Removal.*

Plant.	Amount of metal.	Mode of injection.	Blowing time.	Oxygen used, cu. ft.			Period used.	Saving in tap-to-tap.	Increase in ton/hr.	Fuel saving.		Remarks.
				Per hr.	Total.	Per ton.				Therms.	Proportion.	
									Per cent.		Per cent.	
Appleby-Frodingham	290 tons[1]	Lance	2–3 hr.	36–55,000	110,000	380	H.M. to melt out	3 hr.	17			Trials.
	290 tons[2]	Lance	½ hr.	29,000	14,500	50	down to 0.06 per cent. C.	1 hr.	6			Trials.
Redbourn ..	120 tons[3]	Lance	1 hr.	12,000	12,000	100	0.22 to 0.024 per cent. C.	1½ hr.	12	235	3	Trials.
	120 tons	Lance	½ hr.	19,200	9,600	80	0.23 to 0.03 per cent. C.		ca 15			Standard practice.
Abbey ..	200 tons[4]	Roof-gun	½–1 hr.	35–46,000	32–42,000	160–210	0.4–0.1 to 0.06 per cent. C.	1–2 hr.	8–16	170–250	2–3	Standard practice
Margam ..	100 tons[5]	Back-wall gun	20–45 min.	30,000	10–22,000	100–220	0.5–0.1 to 0.06 per cent. C.	½ hr.	4	300	6	Standard practice—Rimming steel.
	100 tons[6]	Back-wall gun	25–50 min.	30,000	12–24,000	120–240	0.5–0.1 to 0.3 per cent. C.	1½ hr.	10	580	10	Silicon steel.
Steel Co. of Canada	295 tons[7]	Roof-gun			45,100	153	0.4 to 0.06 per cent. C.	¾ hr.	7	1,140	10	One campaign.
USA, plant unknown	303 tons	Lance		44,000					20			55 ton/hr.
USA, plant unknown	210 tons	Lance	5½ hr.	25,000	140,700	670	After H.M.		55			28 ton/hr.
Inland ..	125 tons	3 lances	2½ hr.	118,800	262,500	2,100	After H.M.			No fuel used		40 ton/hr. special trial.

[1] IRON AND COAL, Nov. 14, 1955, pp. 889-896; [2] IRON AND COAL, Nov. 14, 1955, pp. 889-896; [3] JISI, Sept., 1955, pp. 44-48; [4] JISI, May, 1958, pp. 22-24; [5] IRON AND COAL, May, 1958, pp. 1279-1281; [6] JISI, May, 1958, pp. 22-24; [7] AIME, OH Proc., 1956.

the compilation of these tables modifications to the techniques have increased the benefits.

Potential Increase in Output of the Industry

For the purpose of estimating the increase in output that could be achieved by the use of oxygen by present established techniques, it is assumed that only those melting shops producing more than 500,000 ton/year would be justified in installing their own tonnage oxygen plant or taking supply from a grid.

Examination of the foregoing results and the tables indicates that the use of oxygen could lead to the following increases in output. In this assessment it is also assumed that the increases by each of the three methods will be compounded rather than additive when all three are used together on the same furnace.

	per cent
Enrichment of combustion air ..	20
Carbon removal	10
Pre-refining	10
Enrichment + carbon removal ..	30
Enrichment + pre-refining ..	30
Carbon removal + pre-refining ..	20
Enrichment + carbon removal + pre-refining	45

Applying these increases, where appropriate, to 12 firms making between them some 9,300,000 ton/year would yield an extra 3,500,000 ton/year, without the need for new furnaces. This figure assumes the availability of raw materials and, more important, the ancillary equipment to handle materials into and away from the furnaces.

Since the advantages from using oxygen appear so impressive it may be pertinent to inquire why it has not been used on a much wider scale. This is a difficult problem since much depends on the conditions at individual works. Setting aside the possibility of a reluctance to abandon established practice and to accustom workers to new techniques and tempi, it must be realized that the benefits will not be forthcoming unless the melting shops are equipped to deal with materials at an adequate rate. It is already known that melting shops are restricted in their present working rates by insufficient charging facilities, for instance, and no benefits could accrue under these circumstances from faster melting rates. Since the use of oxygen brings about higher heat release rates in the furnace, roof materials are liable to be a restriction. Until companies have had more experience of basic roofs under normal conditions they may be loath to employ them forthwith with oxygen.

These conditions should not apply to pre-refining, but here it has to be established that the total

TABLE 4.—*Combustion Air Enrichment.*

Plant.	Amount of metal.	Place of addition.	Blowing time.	Oxygen used cu. ft. per hr.	Oxygen used cu. ft. Total.	Oxygen used cu. ft. Per ton.	Saving in tap-to-tap.	Increase in ton/hr.	Fuel Saving Therms.	Fuel Saving Proportion.	Remarks.
Appleby-Frodingham	Tons 290[3]	at burners	1 hr. 50 min.	24,800	47,200	163	1¾ hr.	Per cent. 6·2	4·4/ton	Per cent. 11	Old furnace; lower charge wt. than without O_2
	280[3]	,,	1 hr. 40 min.	35,300	58,900	210	6 min.	7·8	2·8/ton	7	Higher charge wt. in O_2 furnace.
Consett ..	175[3]	at burners	4 hr.	30–40,000	120–160,000	700–900	av. 1¾ hr.	12–20		15	Standard practice.
Redcar ..	90[4]	at burners	2 hr.	31,700 av.	52,750	585	3¼ hr.	36	11·6/ton	25	Trials.
	90	,,	4 hr	20,000 av.	70,740	786	2 5/6 hr.	33	7·9/ton	17	,,
	90	,,				720		15–18			Prolonged trials.
Cornigliano ..	235[5]	burners roof-guns	3¼ hr. 50 min.	66,000 59,000	214,000 47,000	900 200	Tap-to-tap time = 5 hr. 23	Ton/hr. = 44·2	Consumption = 22th/ton 30 per cent. reduction compared with using O_2 for C removal		Oxygen - enrichment used for start charge to melt and two roof guns from 0·45 per cent. C to tap.
Dillingen ..	70[6]	at burner	ca 2 hr.	14,000	27,200	390		8	8/ton		
U8SR unspecified	250[7]	gas ports	3½–4 hr.	26–56,000	146,000 av.	av. 585	12–14				
Zaporazhstal	185[8]	at burner	ca 5 hr.	46,000	226,600	1,225		12–16		15	Standard practice.
Serpi Molot[9]		at burner				600–700		9–15			Actual production 1951—53.
Novo Taguil	370[10]	at burner				900	2 hr.	35 ton/hr. 18–20 per cent.		16	

[1] IRON AND COAL, Oct. 21, 1955, pp. 951–960; [2] IRON AND COAL, Oct. 21, 1955, pp. 951–960; [3] JISI, May, 1958, pp. 26–27; [4] JISI, July, 1957, p. 311, Table 4; [5] Metallurgia Italiana; [6] Radex Rundschau, May, 1959; [7] Radex Rundschau, May, 1959; [8] Anwendung von Sauerstoff bei der Stahlberstellung-Bardin, pp. 26 and 47; [9] Bardin, p. 23; [10] Iron and Steel Making, U8SR, BISF, Feb., 1957.

amount of oxygen to be used would enable it to be supplied at an economic figure and that the layout of the plant was such that a pre-treatment station could be set up in a convenient location.

It is also possible that finishing facilities set a limit to the amount of steel required and it may not be economic to work certain furnaces faster while closing down others.

Economics

It is difficult to estimate precisely the economic benefits to be or currently being gained from the use of oxygen. While it is possible to specify the amounts of oxygen used for the various methods, and thus its cost, and in some cases the savings of fuel, it is not possible to say what other costs are incurred nor what overall savings in materials will ensue. It is, however, certain that the increase in production rate will be accompanied by a corresponding decrease in overhead costs and by a fall in labour charges per ton. Fuel costs will also be reduced and there may be changes in raw materials because oxygen will perform some of the oxidation normally carried out by ore or scale additions.

The savings will increase with the extent to which oxygen is effectively used, but will be offset, to a small extent only, by greater refractories wear because of faster driving rate. The gross savings can therefore be estimated only when operating costs are known but it must be stressed that the maximum cost of oxygen will be of the order of 10s. per ton of steel and in most instances will be nearer 5s.

Future Developments

It must not be supposed that the use of oxygen in open-hearth furnaces has been explored to its full extent. Enrichment of combustion air is generally restricted to the charging period, when increased fuel supply is possible because the roof is below working temperature. It has been stated by Russian workers that increased refining rates result from maintaining oxygen enrichment, though with a lower fuel rate, almost to the end of the heat.

Carbon removal is carried out merely to remove the last few tenths of a per cent. of carbon and yet oxygen fed into the bath after addition of hot metal could materially speed up melting down rates—this is indicated by the ability to melt skulls and ingot moulds during pre-refining.

There are thus good grounds for ascertaining whether the period of enrichment should be extended to later in the heat and the period of oxygen injection started earlier. This knowledge can be obtained only by carefully planned works' trials in plants where adequate supplies are available over prolonged periods and such trials are now in progress. It is interesting in this connection to note that using oxygen for enrichment until the bath is melted, though with a reduced fuel rate after the addition of hot metal, and then continuing the heat with oxygen supplied through two roof guns, the Cornigliano steelworks at Genoa has succeeeded in increasing the output rate of a 235-ton basic roof furnace, charged with 60 to 65 per cent. hot metal, to 44 ton/hr. (Metallurgia Italiana, 1959, 51, 257-273.)

Perhaps the most spectacular application of oxygen in this country is the Ajax process. The Ajax furnace, although similar in shape, is no longer an open-hearth furnace and could not be worked as such. It is not to be supposed that the present design represents the ultimate.

In the BISRA survey, 1957, it was suggested that the ideal steelmaking process will depend for its fuel requirements on the metalloids in the hot metal and that it will dispense with normal fuel burners and perhaps with regenerators. The development at Brymbo Steel Works, Limited, is in line with this prediction. It is true that steel has not yet been made in the Brymbo vessel, but the composition of the pre-refined metal taken from it is such that only a short further period of oxygen injection should suffice to produce steel. This vessel resembles an electric-arc furnace and because hearth and banks can be fettled and roof replaced readily, it should

TABLE 5.—*Pre-refining.*

Plant.	Amount of metal.	Vessel.	Blowing time.	Oxygen used (cu. ft.).			Composition after blowing (per cent.).					Temp. rise deg. C.	Output increase in OHF	Remarks.
				per min.	Total.	Per ton.	Si	P	Mn	S	C			
	Tons.		Min.										Per cent.	
Brymbo[1,2]	18	Ladle	60	510	30,500	1,680	0.02	0.12	0.28	0.016	2.3	200	—	—
,, ..	22	OHF	67	355	23,820	1,080	Tr.	0.03	0.23	0.045	1.3	—	—	—
,, ..	22	,,	45	707	30,780	1,350	Tr.	0.04	0.26	0.042	1.5	200–250	—	—
,, ..	18	,,	47	340	16,000	800	Tr.	0.04	0.29	0.042	2.1	—	30	—
,, ..	22	Special vessel	60–90	370	22,000	1,000	Tr.	0.04	0.14	0.04	1.7	150	—	Fe in slag 6.9 per cent. Standard practice
Skinningrove[3]	20	Ladle	20	250	5,000	250	0.5	—	—	—	—	100–130	10	5.5 therms saved Standard practice
Redcar[4,5] ..	32	Ladle	20	400	8,000	250	0.2	—	—	—	3.7	—	—	16 trials
Redbourn[6]	60	Ladle	35–40	450	15,000–18,000	250–300	0.4	—	—	—	—	—	15–20	Standard practice

[1] IRON AND COAL, June 15, 1956, pp. 987-988; [2] British Steelmaker, June, 1959; [3] BISRA, Proc. 42nd Steelmaking Conference; [4] IRON AND COAL, July 20, 1956, pp. 157-159; [5] J.I.S.I., June, 1957, pp. 198-211; [6] Iron and Steel, May, 1959.

have a very high availability. It is, however, of relatively small capacity and there is need to build a larger version and operate it continuously for long periods as a steelmaking unit to ascertain its capabilities and its economics.

The application of gaseous oxygen, now increasingly available in tonnage supply, to the open-hearth furnace for enriching combustion air, for accelerating refining, and for reducing the metallurgical load on the furnace, has been established as standard economic practice in a number of works.

The increases in output rates from these three methods vary from 6 to 36 per cent., 6 to 17 per cent., and 10 to 30 per cent., respectively, depending on the proportion of hot metal in the charge and its composition, and on the amount of oxygen used.

The techniques at present employed in the open-hearth furnace do not represent the limit to which oxygen can be used. Existing open-hearth furnaces may be modified, as in the case of the Ajax furnace, so that they become essentially oxygen steelmaking units. Gains in production rate and fuel savings much greater than those represented above then become possible.

RECORD YEAR for

Canadian Iron and Steel

LAST year was the most productive and profitable in the history of the Canadian iron and steel industry, surpassing the production record established in 1956. In a memorandum based on an article appearing in the June issue of Mineral Trade Notes (issued by the Bureau of Mines, US Department of the Interior), the intelligence department of the British Iron and Steel Federation points out that steel ingot production in 1959 reached 5,817,012 net tons, compared with 4,254,607 tons the year before; of this total, basic open-hearth (including LD steel) accounted for 5,267,282 (3,797,152) tons and electric 549,730 (457,455) tons. The total for steel ingots and castings was 5,921,728 (4,345,291) tons.

Pig-iron production reached 4,181,794 (3,060,962) tons. Of the 15 blast furnaces in Canada in 1959, 13, with an annual production capacity of 3,699,000 tons, were operating and two with a total capacity of 549,300 tons were idle. Total ingot capacity on January 1, 1959, was 6,313,000 tons (basic open-hearth, 4,497,000 tons, LD, 1,110,000 tons, and electric, 706,000 tons), and steel castings capacity was 416,000 tons.

The Steel Company of Canada, Limited, in 1959 produced 1,286,000 tons of pig-iron and 2,438,000 tons of crude steel. Plant rated productive capacity on January 1, 1959, was estimated at 1,450,000 tons of pig-iron and 2,500,000 tons of crude steel. The company's new 100,000 tons per annum steel tube mill at Contrecoeur (Quebec) was commissioned last year. The company states that in addition to its $52,000,000 expansion programme, certain phases of which were completed in 1959, other improvements and services are planned for 1960. A new 300-ton open-hearth furnace is to be commissioned early in 1961, bringing the company's crude steel capacity up to 3,000,000 tons. A new $10,000,000 tube mill at Camrose (Alberta) was scheduled to be in operation by April this year. This mill, producing tubes of 16 in. to 42 in., outside diameter, will be the first in Canada to produce steel tubes larger than 36 in. in continuous 40-ft. welded lengths. Capacity will be 325,000 tons per annum.

The Algoma Steel Corporation, Limited, produced 1,552,428 tons of pig-iron and 1,371,768 tons of crude steel (798,000 tons open-hearth and 572,868 tons LD). The company's new universal beam mill now under construction is to be commissioned early in 1961. In December, 1959, Algoma announced a $1,500,000 expansion programme to increase the daily productive capacity of its second largest blast furnace from 1,250 tons a day to 1,575 tons.

The Dominion Steel & Coal Corporation, Limited, and the Belgian subsidiary company, Société Générale de Belgique, are proceeding with their joint project to build an integrated steel plant in the Montreal area (at Contrecoeur).

Dominion Foundries & Steel, Limited, produced 750,000 tons of pig-iron and 884,337 tons of crude steel in 1959. Rated annual capacity as of January 1, 1960, was estimated at 750,000 tons of pig-iron and 1,000,000 tons of crude steel. The company's expansion plans for 1960, estimated at $27,000,000, include continued construction of a third blast furnace, installation of a second continuous galvanizing line, construction of four soaking pits, and construction of a dock. The third blast furnace will bring pig-iron capacity up to 1,500,000 tons per annum, and crude steel productive capacity will be raised to 1,200,000 tons a year.

Quebec South Shore Steel Corporation, the first integrated steel plant in Quebec, was formed last year. The company's new 150,000 tons per annum plant, to be built at Varennes, will use the strategic-Udy process (rotary electric furnace combination). Construction of the plant was scheduled to begin early this year. Construction of the Consolidated Mining & Smelting Company's new works at Kimberley (British Columbia) was begun in 1959. Crude steel capacity will be 100,000 tons per annum and there will be a 36,500-ton per annum electric pig-iron furnace. The addition of a second larger furnace and oxygen-blown converters with rolling plant will follow.

News from Australia

Steps to Overcome Steel Shortage

DESPITE record production of steel at the rate of 3,500,000 tons of ingots per year, the Broken Hill Proprietary Company, Limited, is unable to supply Australia's steel requirements. In the past three years production of steel ingots has been raised by 50 per cent., adding 1,157,000 tons to the industry's annual capacity. In the six months to November 30, 1959, capital expenditure totalled £13,000,000. At Port Kembla, New South Wales, the first section of the third battery of by-product coke ovens is in production and the second sinter plant was completed recently. Site work for the cold-rolling mill and electrolytic tinplate mill is in progress, and a tenth hot dip tinplate will raise capacity for tinplate to 118,000 tons per year.

A new open-hearth furnace with a capacity of 300,000 tons of steel per year has been authorized. After extensive geological examination and diamond drilling, work has started on opening up the iron-ore deposits at Kooland Island, Yampi Sound, in Western Australia.

Works at Whyalla

The establishment of a steelworks at Whyalla would be speeded to meet a heavy increase in the demand for steel in Australia, the Premier, Sir Thomas Playford, said in Adelaide. It is hoped that some of the steelmaking processes will be in production well before 1965. Added blast-furnace capacity will extend steel output much beyond the 400,000 tons a year planned earlier. Work has already begun on the steelworks site and on associated projects.

Experiments in the use of low-grade ores have been so successful that Australia will not in future have to rely on its relatively small tonnages of high-grade ore.

The South Australian Government has authorized a low-level aerial survey to search for iron ore. The area to be surveyed comprises 326 square miles south of Kyancutta, central Eyre Peninsula, where magnetic indications have been obtained by a high-level survey made by the Bureau of Mineral Resources. The survey will be carried out by Adastra Hunting Geophysics, Limited, and it is hoped that targets for diamond drilling will be indicated.

The Premier of South Australia has also announced that Broken Hill Associated Smelters Pty., Limited, at Port Pirie, will treat the slag dump at the smelters for recovery of zinc. A new type of blast furnace will be used. The cost of the plant with ancillary equipment will be £2,500,000, in addition to the cost of the proposed coke works, estimated at £750,000. Water requirements for the new enterprise will be catered for following duplication of the Morgan-Whyalla pipeline. It is hoped to complete the coke works by the end of 1961 and to have the furnace in production two years later.

It is planned to establish steelworks in the Philippines by the end of 1963 with West German financial and technical assistance. Associated Management Company, Inc., which owns and operates the Santa Inez iron mines near Manila, will undertake the steel mill in partnership with Krupps. A production rate of 150,000 tons a year is planned.

Agreement has been reached between the New Zealand Government, Industrial Metals, Limited, and Fletcher Holdings, Limited, on detailed plans for a merchant bar mill in Auckland. Co-sponsors of the scheme will join with other groups to form a company—Pacific Steel, Limited—which will own and operate the mill based almost entirely on NZ raw material.

Output will be about 50,000 tons a year of merchant bar products over a reasonable range of shapes and sizes, as justified by the market and by technical progress.

Efficiency of Operatives

When it was announced in 1957 that the Commonwealth Steel Company, Limited, was planning to establish a £4,000,000 cold-roll stainless steel plant, a prediction was made that it was very doubtful whether Australian operatives could be trained to the high efficiency required. This was said by Mr. Colin Syme, chairman of Broken Hill Proprietary recently. Experience had shown that Australian operatives could do high-standard work if given adequate training, he added. Mr. Syme said the decision to establish the plant at Unanderra was one of the most important taken by the company.

Industry today makes constantly increasing use of stainless steel sheet and strip. To meet the demand the company has built a new cold-rolling plant at Unanderra (south coast of New South Wales), in which is installed a Sendzimir mill. It is the only one of its kind in the southern hemisphere and probably is the most most modern. The plant came into operation on September 1, 1959, and has an initial capacity of 10,000 tons a year—ample for the present estimated Australian demand of 8,000 tons a year. It can be readily expanded to produce 15,000 tons a year.

Comsteel's stainless steel plant and strip mill is the first of its type in Australia and it will open many fields for hundreds of Australian manufacturers using the new product.

Unanderra was selected as the site because of its proximity to the hot-strip mill at Port Kembla Works of Australian Iron & Steel Pty., Limited. Ingots made at Waratah are first rolled to slabs at Australian Iron & Steel. Slabs are then dressed by grinding in a special slab-dressing unit installed for the purpose. These are then rolled to coil normally 0.125 in. thick and weighing 9,000 lb. These coils are then taken by rail to Comsteel's Unanderra plant for further processing and final cold-rolling.

Simultaneous Shaft Sinking and Lining at SOUTH KIRKBY COLLIERY

By H. KENDALL* and J. HAWLEY†

A system of simultaneous sinking and lining, making high-speed sinking possible, is described in this paper, presented to the Yorkshire Branch of the National Association of Colliery Managers on November 10, 1959. A double-drum, flat-rope, electric winding engine used to hoist the hoppits to the surface, and a separate emergency manriding engine, which was modified for concrete winding, are described by the authors. An account is also given of the operation of the hydraulically powered movable shuttering, together with a system of mechanical loading, using two scaffold-mounted cactus grabs.

SOUTH KIRKBY COLLIERY lies in the south Yorkshire coalfield and is situated approximately midway between Doncaster, Wakefield, and Barnsley. The two shafts forming the colliery, each 15 ft. dia., were sunk in 1880 to the Barnsley Seam. In 1897, a staple shaft was sunk from the Low Beamshaw to the Top Haighmoor Seam to provide a downcast shaft and No. 2 Shaft deepened to the Haighmoor Seam to form an upcast shaft. The Barnsley, Top Haighmoor, and Low Beamshaw seams were then worked.

Working in the Top Haighmoor Seam ceased in 1939, due to a major wash-out, leaving the mine dependent upon the output produced from the Barnsley and Beamshaw seams. As the reserves in the original Barnsley "take" were limited, the Dunsil Seam was developed in 1948 to maintain output. During the past few years additional valuable reserves in this seam have been proved. The total workable reserves amount to 84,000,000 tons, 17,000,000 tons of these being in the Barnsley and Haighmoor seams. In 1956, a major reconstruction programme was approved for this colliery.

The existing shafts, being of small diameter, were inadequate for the planned pithead output of 5,000 ton/day. It was necessary to sink a new shaft, 24 ft. dia., to a depth of 812 yd. in which to raise the output and meet the ventilation requirements of the reconstruction. This shaft is called No. 3 Shaft, and the sinking of it is the subject of this paper. Fig. 1 shows a section through all shafts.

Specification of No. 3 Shaft

The programme laid down for the new shaft was for simultaneous sinking and lining, the minimum excavated shaft diameter to be 26 ft., with a minimum of 12 in. concrete lining. The contractor was to provide his own winding engine, sinking headgear, compressors, concrete mixer, and all ancillary sinking equipment.

It was expected that sinking speeds of over 50 yd. per month would be attained. Ventilation insets were to be made at three points, the Beamshaw Seam, the Dunsil Seam, and at a level 2,100 ft. b.o.d., 50 yd. below the Haighmoor Seam. The skip inset was to be constructed some 12 ft. below the 2,100-ft. level. Two small insets were also to be constructed, one providing access to the Shafton Seam and the other access to the shaft bottom for the removal of spillage. All works were to be finished, including sinking and insets, within a period of two years.

Partly as result of the board's policy to engage sinking contractors with improved techniques capable of increased sinking speeds, Haniel & Lueg, Düsseldorf, was the successful tenderer. Laeven, Holland, was the sub-contractor to Haniel & Lueg for the construction of the concrete lining. The specification of the concrete mix to be used was 1:2:4 using washed quartzite gravel, graded 1¼-in. down, and natural sand, clean and well graded.

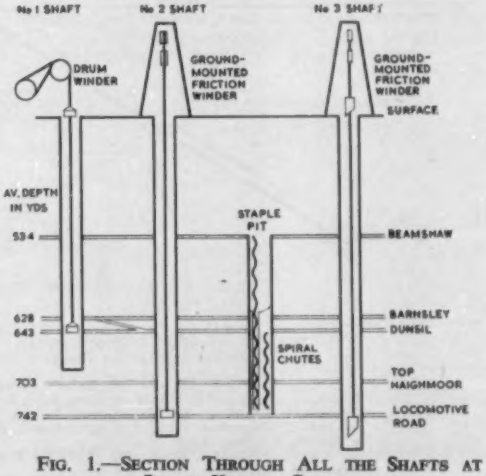

FIG. 1.—SECTION THROUGH ALL THE SHAFTS AT SOUTH KIRKBY COLLIERY.

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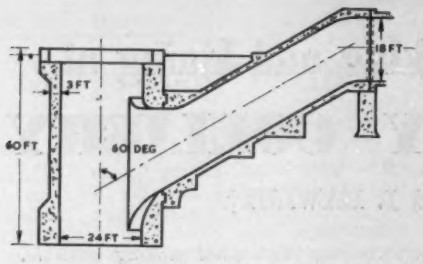


FIG. 2.—SECTION THROUGH SHAFT COLLAR AND FAN DRIFT.

Shaft Collar and Fan Drift

The construction of the shaft collar and fan drift (Fig. 2) was completed by mid-March, 1958, to a depth of 60 ft. from the surface. This work was carried out by Holst & Company, Limited, Leeds, using a surface crane for the excavation. The shaft collar and fan drift were designed to receive the contractor's sinking headgear, leaving room for the proposed Koepe tower foundations. Simultaneous erection of the tower while using the headgear was thus made possible.

The make of surface water encountered in the fan drift reached a maximum of 30 gal./min., but this was later stopped by cement injection of the collar and fan drift walls.

Surface Plant

The headgear supplied by the contractor is a continental derrick type, 75 ft. high, of robust tubular steel construction. The legs are well splayed to carry the numerous pulley and rope services, together with scaffolds, doors, and tipping gear. The headgear was erected ready for use by March 17, 1958. Fig. 3 shows the layout of the rope services. The double-drum winding engine of 660 h.p. for the sinking, controls two hoppits of 53 cub. ft. capacity which are suspended by flat ropes, $3\frac{11}{16}$ in. by $\frac{21}{32}$ in. The drums are secured in position by pins which are removable to allow adjustment for the depth of sinking as the hoppit run extends. This operation is carried out for every 4 to 5 ft. of sinking and takes only 5 min. to complete.

The capstan engine is built in the forefront of the winder house (Fig. 4) and hauls the concreting scaffolds and associated equipment up and down

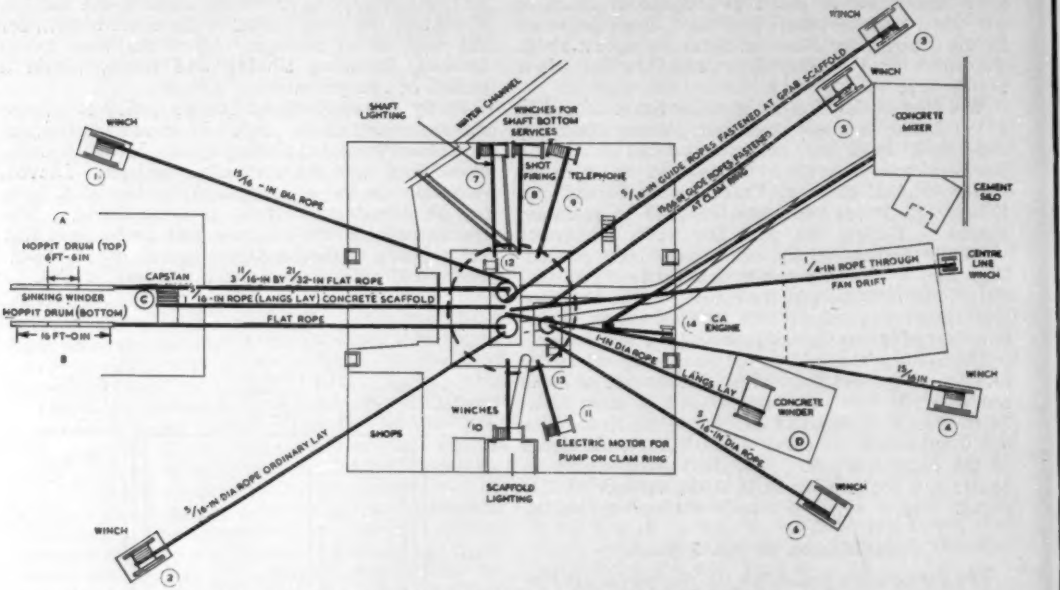


FIG. 3.—PLAN OF SINKING HEADGEAR SHOWING SHAFT SERVICES.

A and B.—Double-hoppit Winding Drums.
C.—Concrete Scaffold Capstan.
D.—Emergency and Concrete Winder.
} ELECTRIC.

1-4.—Tension Cable Winches and Rider Guides to Grab Scaffold.
5 and 6.—Rider Guide Ropes to Clam Ring for Concrete Hoppit.
7-9.—Shaft Lighting, Shotfiring, and Telephone Cables.
10 and 11.—Concrete Scaffold Lighting and Electric Cable for Motor on Clam Ring.
12 and 13.—Winches for Signal Wires to Bottom and Concrete Scaffold.
14.—Haulage Engine for Concrete Hoppit Transport.
} COMPRESSED-AIR DRIVEN.

FIG. 4.—ENGINE HOUSE WITH THE DOUBLE-DRUM WINDING ENGINE IN THE BACKGROUND AND THE CAPSTAN ENGINE IN THE FOREGROUND.

the shaft as required. The capstan rope is attached to the concreting scaffold by a system of pulleys so that the ratio of rope movement to scaffold movement is 4 to 1, giving a maximum rope speed of 32 ft./min.

An emergency winder for men, which is also used for winding concrete, is of the single-drum type, using a Lang's lay 1-in. dia. rope. It is driven by a 100-h.p. electric motor. The capacity of the concrete hoppit is 1 cub. yd. and it is also used for manriding to and from the concreting scaffold.

Six separate 8-h.p. compressed-air winches, with $\frac{15}{16}$-in. dia. ordinary strand lay ropes, are used for ancillary purposes, two support guides for the concrete hoppit, and four support guides for the sinking hoppits. The two guides for the concrete hoppit are anchored at the expanding ring. The four guides for the sinking hoppits are anchored to the grab scaffold and are used to raise or lower the scaffold. The ropes are $\frac{11}{16}$ in. dia. ordinary lay.

Five smaller winches are sited within the sinking hall and carry telephone, shotfiring, shaft lighting, scaffold lighting, and electric power cables.

Compressors and Ventilating Fan

Compressed air is used extensively for the sinking operations. Two electric Demag rotary air compressors produce the supply, separately or together as required. One, driven by a 210-h.p. motor, has an output of 900 cub. ft./min. and the other, powered by a 140-h.p. motor, produces 700 cub. ft./min., both compressing to 100 lb./sq. in. These compressors have fully met peak demands for compressed air without failure at any time. A portable diesel-driven 140-h.p. Demag rotary compressor with an output of 500 cub. ft./min. at a pressure of 100 lb./sq. in. is kept as a standby. The cooling water requirement of the larger compressor is 10,800 gal./hr. and that of the smaller compressor 8,640 gal./hr.

The ventilating fan is electrically driven by a 50-h.p. motor and has a capacity of 8,000 cub. ft./min. The ventilation tubes are 2 ft. dia., 12 ft. in length, and fitted with rubber sealing rings. Fresh air is forced down the ventilation tube to the shaft bottom, and returns up the shaft.

The concrete mixer shown in Fig. 5, is a fully automatic weigh batching and mixing plant. It is capable of producing sufficient concrete for lining a 22-ft. length of the 24-ft. dia. shaft with an 18-in. to 24-in. thick lining in 24 hr. The output of the mixer is $\frac{1}{2}$ cub. yd. per batch, and during frosty weather the aggregate is steam heated.

The capacity of the cement-silo is 30 tons. The cement is transported in bulk to the site and blown into the silo. The concrete mix is generally of 1:2:4 ratio except where the engineer specified a 1:1½:3 mix through water-bearing strata and where the shaft sides were faulty and very friable. This plant adequately met all concrete production demands and has operated throughout without failure. A summary of the test on the concrete is given in Table 1.

Dirt Disposal Arrangements at the Surface

The mucking hoppits each have a capacity of 53 cub. ft. and carry approximately 2 tons of debris. The "lazy chain" method by which they are

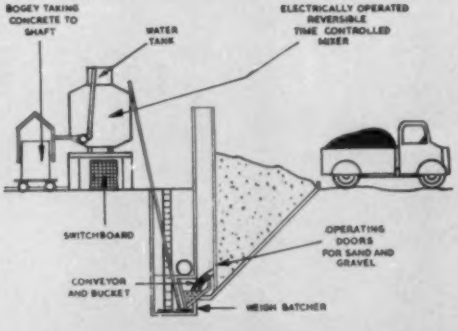


FIG. 5.—FULLY AUTOMATIC WEIGH BATCHING AND MIXING PLANT FOR SOUTH KIRKBY COLLIERY, No. 3 SHAFT.

TABLE 1.—*Summary of Concrete Tests on 6-in. Cubes.*

Random dates.	Age at test.	Weight.	Density.	Crushing load.	Compressive strength.
	Days.	Lb. oz.	Lb./cub. ft.	Tons.	Lb./sq. in.
20.8.59 ..	7	18 10	149	72.5	4,517
14.8.59 ..	7	18 10	149	57.5	3,583
17.7.59 ..	7	18 10	149	53.8	3,350
3.7.59 ..	7	18 12	150	71.8	4,467
26.5.59 ..	7	18 8	148	63.8	3,970
3.7.59 ..	28	18 12	150	84.8	5,283
8.7.59 ..	28	18 10	149	75.5	4,700
25.6.59 ..	28	18 10	149	84.2	5,250
15.6.59 ..	28	18 12	150	86.9	5,417
23.4.59 ..	28	18 6	147	65.3	4,067

Note.—Concrete mix 1 : 2 : 4. Gravel—clean washed quartzite graded 1½ in. down. Sand—natural sand, clean and well graded.

dumped at the surface provides an extremely quick method of discharge and return. Safety is assured by a system of double doors at the surface. One set of these doors is pneumatically operated at ground level and closes horizontally after the full hoppit has been wound beyond the shaft top.

The second pair of doors, which is also operated pneumatically, completes the discharge chute when closed. The doors are closed before the "lazy chain" is attached to one of the rings underneath the hoppit. The hoppit is then lowered and its contents tipped into the chute and thence into 15-ton capacity Euclid tipping wagons. Two Euclid tipping wagons are in regular use with a third as standbye. There are two surface banksmen, one at ground level and one at the tipping level.

Disposal of debris has been very satisfactory indeed and there have been no delays whatsoever in disposing of it, even when the maximum rate of sinking was achieved.

FIG. 6.—LOADING WITH COMPRESSED-AIR OPERATED CACTUS CRABS.

Shaft-bottom Equipment

Mucking out of the debris from the shaft bottom is done by two compressed-air operated cactus grabs, each of which holds a maximum of 11 cub. ft. of material. The grabs are operated from controls on the shaft sump (Fig. 6). They are located on a grab scaffold which is secured to the shaft sides and is also held by four guide ropes of $\frac{5}{8}$-in. dia. These ropes are controlled by four compressed-air driven winches which are located on the surface.

The four grab-scaffold ropes act as guides for the two sets of riders which the hoppits leave and later pick up as they pass through the grab scaffold.

At the shaft bottom the two grabs can be moved across the sump by independent compressed-air drives. The grabs are suspended below the grab scaffold. The drives which provide the movement of the grabs are bogey-mounted on rails on the scaffold, and can work anywhere on the sump floor. Also on the bogey is the hoist which lowers and raises the grabs when filling out debris. While a full hoppit is being raised to the surface the grabs are loading hoppits standing at the shaft bottom. The downcoming empty hoppit is spotted by the crew in the sump away from the waiting full hoppit.

As the full hoppit is raised into the headgear the slack in the winding rope at the shaft bottom allows this winding rope hook to be detached. After the hoppit at the surface has been tipped, the slack rope at the shaft bottom is attached to a full hoppit. The upper doors are then opened and the empty hoppit is lowered down a short distance while the full hoppit is lifted. The doors at ground level are then opened and the hoppits signalled away.

Certain exemptions were granted by HM Inspectorate of Mines from some provisions of the Mines and Quarries Act, 1954, and subsequent Regulations.

In the sinking a pull of 11 ft. is obtained by 1¼-in. holes bored to 11 ft. or a little over. There are approximately 55 to 65 holes to the round using 300 to 360 lb. of 1¼-in. Polar-Ammon gelignite, according to the nature and strength of the strata. The wires of the detonators used are alkathene sheathed and are 168 in. long. In wet conditions the wire joints are sealed with grease-filled thimbles.

Eight Holman "Silver 3" boring machines with attachments for wet boring are used. They drill a complete round of 55 to 65 shotholes to a depth of 11 ft. in approximately 2½ hr. The lengths of the boring rods used are 4 ft. 6 in., 7 ft.

6 in., and 11 ft. 6 in., respectively. This drilling gear is lowered, complete with quick couplers, in-line oilers, hoses, drills, and rods in a special hoppit after surface servicing. Only two compressed-air connections have to be made in the shaft bottom to enable all eight drills to be used.

The shotholes are blown out by compressed air before charging. Charging of the holes takes approximately 1½ hr. using 5-5½ lb. of explosive per hole. Each hole is filled and tamped to the top with sand, using wooden stemming rods. Indicator rods are used when the holes are being drilled and when charging is being done.

Milli-second detonators Nos. 1, 5, 8, and 12 are used, giving delays of 25, 150, 265, and 465 milliseconds, respectively. The rounds are drilled and fired as indicated in Fig. 7.

A Beethoven 100-shot exploder is used to fire the round. Before firing the circuit is tested for continuity. This operation, including the withdrawal of the sinkers, lighting and signalling cables, the clearance of the explosive fumes, and the return of the sinkers to the shaft bottom, takes about one hour.

Before the shots are fired the two cactus grabs are raised up to the grab scaffold to protect them from damage. The grab scaffold is not raised.

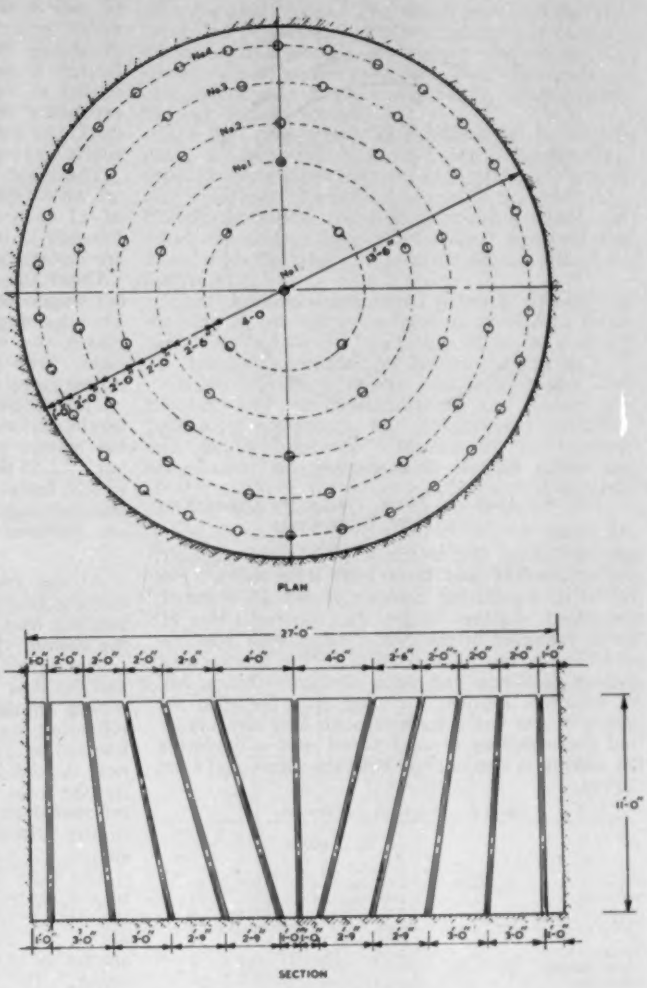
Cycle of Operations

Loading out the dirt takes about 16 hr. using the two cactus grabs. There are normally two teams of four men, one team to each grab, plus one chargeman who attends to the shaft signals; 100 to 120 hoppits can be loaded in the 6-hr. shift. There are four shifts of sinkers per 24 hr. and 240 to 265 hoppits are filled out from each firing equalling approximately 500 tons of debris per round.

Setting of rings, temporary supports, and back sheets takes about 3 hr., thus completing the 24-hr. cycle for an 11-ft. pull (Fig. 8). Ventilation and compressed-air pipes of 24 in. and 6 in. dia., respectively, are used and are extended as necessary.

The temporary shaft lining rings are returned to the surface for servicing and are sent back as complete rings for use as sinking proceeds. Pins are dropped into holes to form the joints in the channel sections. These sections can be extended, using other pin holes, to any shaft diameter necessary, *e.g.*, 30 ft. dia. where 3-ft. thick concreting is done. Each shift of sinkers takes over where the last shift leaves off, making for continuous operation in the sump. The shifts change over at the surface. Manpower employed while sinking is shown in Table 2.

The contractor's supervision consists of one engi-



	HOLES	DELAYS	MILLE SECS
RING No 1	10	1	25
RING No 2	10 – 12	5	150
RING No 3	15 – 17	8	265
RING No 4	28 – 30	12	465

FIG. 7.—BORING PATTERN IN NO. 3 SHAFT SINKING, SOUTH KIRKBY COLLIERY.

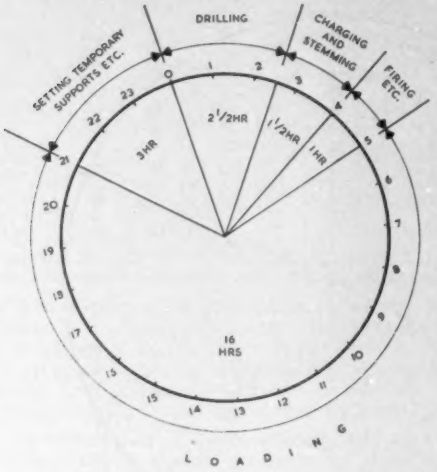


FIG. 8.—AVERAGE 24-HR. CYCLE OF OPERATIONS FOR 11-FT. ADVANCE.

neer in charge, one mechanical/electrical engineer, one accountant, and three shift supervisors. For the NCB, supervision consists of Mr. H. Kendall, designated engineer under the contract, Mr. H. Smith, manager of the No. 3 Mine, who was responsible for the authorization of the contractor's staff in shotfiring and other statutory duties, Mr. M. Dunwell, resident surveyor, who recorded the details of the strata sunk through and also organized the sampling of coal seams met with during the sinking in conjunction with the Divisional Coal Survey.

TABLE 2.—*Disposition of Manpower.*

	Men working.	Average shifts per day.
Sinkers	6-hr. shifts, 9 per shift	36
Concreting	8-hr. shifts, 8 per shift	24
Banksmen	8-hr. shifts, 2 per shift	6
Winders	8-hr. shifts, 1 per shift	3
Others	8-hr. shifts	12
Officials	—	6
Administration	—	3
Absentees	—	10
Total	—	100

Lining Equipment

Based on experience gained in Holland and Germany, Haniel & Lueg engaged a Dutch firm, Laeven NV, to construct the shaft lining to be carried out simultaneously. The technique involves the use of a sliding shutter in the construction of the concrete lining of the shaft wall.

The original concreting gear consisted of five main parts:—(*a*) The expanding ring; (*b*) eight climbing ropes; (*c*) concrete working platforms and climbing shutter; (*d*) the oblique shutter; (*e*) the lower ring.

The expanding ring is a platform consisting of two parts and has to carry a maximum load of approximately 32 tons during concreting. Its two parts are forced against the shaft wall by means of two 30-ton oil presses. To increase the frictional grip between the outside surface of the expanding ring and the shaft wall, the circumference of the ring is lined with a special material similar to Ferodo brake lining. The floor of the expanding ring is covered with steel plates ¼ in. thick. In the floor are the fenced openings through which sinking and concrete hoppits pass.

The eight locked-coil ropes are 1¼ in. dia. and are about 90 ft. long. They have a safety factor of 17 to 1. The upper ends of the ropes are fastened to the expanding ring and the lower ends are connected to the lower ring.

From the expanding ring eight climbing ropes are suspended to the lower ring, which hangs free. The climbing shutter moves along these ropes by means of a series of rope wedges and oil-operated jacks. The jacks are operated by an electrically driven pump which is sited on the bottom platform.

The oblique shutter forms the base of each new length of lining. It is constructed from the climbing shutter and wedged to the shaft side at an angle of 55 deg. from the vertical. The lower ring, which hangs freely in the shaft, is simply an annular ring on which the eight climbing ropes are anchored.

Sequence of Operations

At the completion of a length of lining the moving shutter has climbed the ropes to the expanding ring, the lower ring still hanging freely at the bottom of the ropes.

The capstan rope is attached to the sliding shutter and the rope wedges released. The diameter of the sliding shutter is reduced to clear the lining by retracting four wedges. The climbing shutter is then lowered by the capstan rope to its original position near the oblique shutter and is clamped to the ropes by the rope wedges. The capstan rope is now refastened to the expanding ring, and the oblique shutter dismantled and placed on the climbing shutter.

The expanding ring is contracted and the whole of the equipment is lowered into position to start the next length of lining. It is now some 20 ft. above the base of the completed lining and the shutter is in position to start the next 60 ft. of lining. The climbing shutter is expanded to the shaft diameter by means of the four wedges.

The oblique shutter is erected on to the shaft side from the climbing shutter and concrete placing commences behind it. The first 40 in. of concrete takes about 2 hr. to place. After placing this length the temporary support rings are removed prior to raising the shutter. Four hours after the initial start of concrete pouring the shutter may begin climbing at the rate of 4 in. per 25 min.

Each platform is equipped with eight rope wedges. These wedges hold the platforms firmly to the rope and will only permit them to be raised. The platforms are connected by eight double-acting oil-operated jacks of 25-in. stroke.

A working pressure of 700 lb./sq. in. enters the bottoms of the cylinders and the climbing shutter is inched upwards. The rope wedges on the upper platform remain open and loose so long as the pressure is applied extending the jacks. During

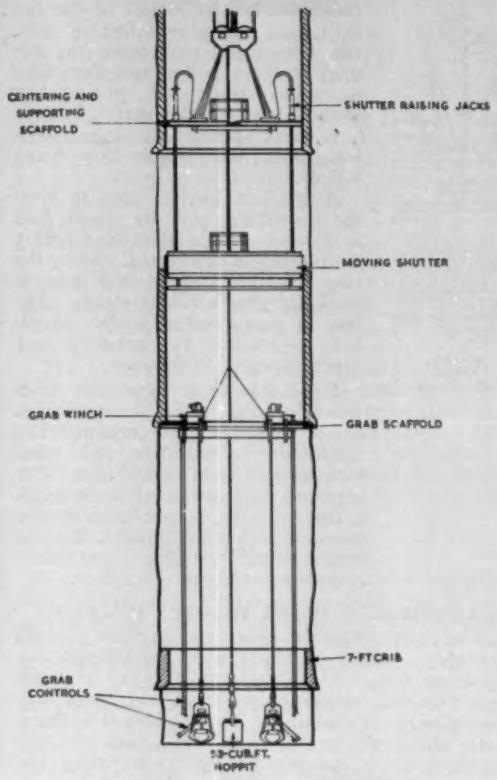


FIG. 9.—GENERAL ARRANGEMENT OF MODIFIED EQUIPMENT FOR SINKING AND LINING.

this period the wedges of the lower platform support both platforms. In a similar manner, when the pressure is applied to the top of the jacks, the lower platform is raised, the rope wedges on the upper platform taking the weight. The operations are continued until the length of lining is closed.

The friction-type rope wedges are operated by the platform weight. In order to lower the platform down the climbing ropes a screw attachment permits the wedges to be withdrawn. While concrete is being poured the temporary lining and backsheets are removed as required and sent to the surface in the concrete hoppit.

Modifications During Sinking

The continental system of temporary supports was only partially successful. Weak strata conditions gave cause for concern and the following modifications were made to the temporary lining, concrete lining equipment, and pumping equipment. A 7-ft. concrete crib was also introduced, the concrete pipeline was replaced by hoppit winding, and further pre-cementation practised.

The temporary lining used in the early part of the sinking was simply a tube made up of shaft rings and light metal sheets which had little contact with the shaft sides. The sheets were not secured firmly as is normally the practice in this country when backing boards are tightly wedged to the strata. This system was modified following a collapse of side in December, 1958, after passing through faulted ground.

The first ring is now suspended from hooks beneath the completed concrete lining. Hangers then support lower rings and, in addition, every fourth ring is secured by steel dowel pins to the shaft side. Corrugated sheets are used as backing sheets and where necessary these are wedged between the strata and the rings. The rings are at 4-ft. 9-in. centres.

The conditions encountered seriously affected the working of the lining equipment, which was originally designed for use in a frozen shaft. As a result, the lining was considerably behind the sinking.

To obviate these delays caused by water and grout fouling the climbing ropes and wedges the concreting equipment was substantially modified and greatly improved. Instead of the hoisting mechanism and wedges being located under the climbing shutter, they were installed on the expanding ring well above the concreting (Fig. 9).

The jacks have been completely redesigned, so that the ropes pass through them. The bottom rope wedges are built into the cylinder base, and the top rope wedges are built on the heads of the jacks.

The working scaffold is fastened to the ropes and instead of the scaffold climbing up stationary ropes

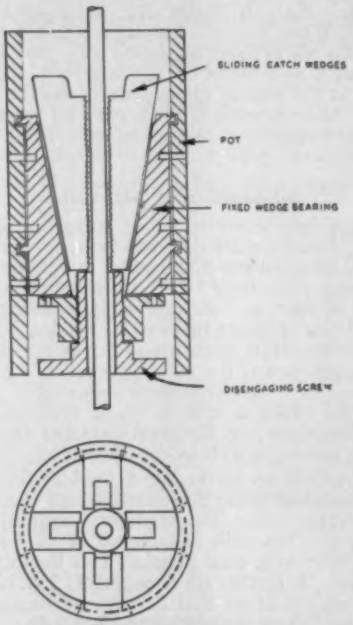


FIG. 10.—PLAN AND SECTION OF THE ROPE WEDGES WITH THE CATCH WEDGES RELEASED.

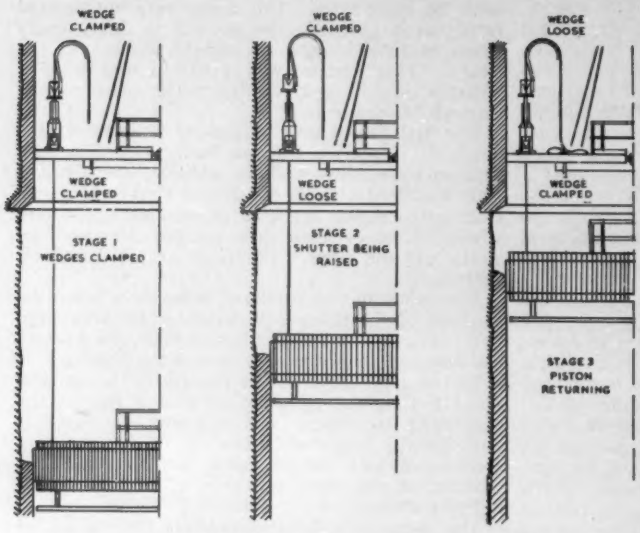


FIG. 11.—OPERATION OF THE SLIDING SHUTTER.

the ropes themselves climb through the stationary expanding ring. As the jacks are raised the upper wedges grip the ropes and raise the climbing shutter, the bottom wedges allowing the ropes to pass through. Fig. 10 shows the upper and lower wedges. When the cylinders are at the top of their stroke the oil pressure is turned off. The load of the ropes is now taken up by the grip of the lower wedges at the base of the cylinders. As the pistons retract, the loose ends of the ropes feed through the open top wedges and coil up on the expanding ring (Fig. 11).

Introduction of 7-ft. Crib

Trouble was experienced in using the oblique shutter. Considerable time was being lost in installing and dismantling it. Instead of attempting to construct a crib about 100 ft. up the shaft with the oblique shutter, a 7-ft. crib is installed at sump level. These cribs are installed at varying intervals.

Where the strata is strong the cribs are installed 48 ft. apart, and if the strata is weak this distance is reduced to 30 ft. This means suspending sinking operations while a crib is being installed. The shaft conditions are so improved that the slight delay to sinking is well worth while.

Each crib is set on top of a fired 11-ft. pull so that subsequent firing does not damage the newly-laid concrete crib. The segmental shuttering for forming the 7-ft. crib is built up of 12 4-ft. high by 6-ft. 3-in. long steel panels. This depth is then concreted. A further set of segments 3 ft. high are erected on top of the first shutter and further concrete placed, thus completing the 7-ft. crib.

All cribs are checked for verticality and level by the board's surveyors. The centre line, which is positioned at the mouth of the fan drift, and the plumb line of ¼-in. dia. wire rope, pass down the fan drift under a pulley and then over a pulley suspended just below ground level on the shaft centre.

It is a permanent fixture, the weight of the plumb bob being 120 lb.

A quickset level is used to level the shuttering, and the plumb bob is allowed to settle while the levelling of the ring is completed. When the ring has been jacked and wedged level the plumb bob is steady. The ring is then centred to the plumb bob, re-levelled as necessary and finally wedged in position.

Eight side lines suspended from the completed lining above provide a ready check to the centring. The installation of the 7-ft. crib takes 8 hr. every fourth or fifth day. The modified system therefore involves a loss of some 8 per cent. to the continuous sinking process, but the improvement to shaft conditions completely nullifies this loss.

Application of Hoppit Winding for Concrete

The 6-in. pipeline from the surface to the climbing scaffold originally used for transporting concrete was not satisfactory. Due to the dry mix frequent blockages occurred and there was heavy wear on the pipes. The pipeline was therefore withdrawn in February, 1959, and concrete transported to the scaffold by hoppit using the emergency manriding winder. This method of transporting concrete has proved highly satisfactory and is quite capable of keeping pace with maximum sinking speeds.

It was originally believed that the sinking would be relatively dry. However, the strata near the surface and the Ackworth Rock proved to be water bearing.

Down to a depth of 120 yd. the maximum make of water was 290 gal./min. This was quickly reduced to 33 gal./min. by pre-cementation through the Ackworth Rock to seal off the feeders of water. The 33 gal./min. continued to flow from small feeders above the Ackworth Rock and near to the surface. These small feeders were finally stopped by cement injection at the beginning of 1959, since when the total make of water has remained steady at 3 gal./min.

At the shaft bottom the water was dealt with in the following manner:—(*a*) For the maximum make of water three Gollner 100-gal./min. submersible pumps were employed to pump it to the surface; (*b*) when the quantity of water was small the water was wound to the surface in the sinking hoppits. The hoppits were filled by means of submersible Holman rotary pumps, which fill a 300-gal. hoppit in 7½ min.

Pre-cementation

In addition to the injection at the Ackworth Rock it was deemed advisable to pre-cement the Oaks Rock against the possibility of it being water bearing. The pre-cementation took the form of two frustrams of a cone overlapping 21 ft. Each length consisted of some 35 1¼-in. dia. holes which were 49 ft. long in the first section and 55 ft. in the second. They covered the vertical distance from 5 ft. above the top to 7 ft. below the base of the Oaks Rock.

The cement mix employed was 1 part of cement to 1-1½ of water. The mixing of the cement milk was carried out in the shaft bottom by means of a tank fitted with a paddle mixer. It was injected into the stata by a reciprocating pump at a pressure of 150 to 450 lb./sq. in.

The injection tube consisted of two concentric pipes which moved one within the other by means of a screw. The extension of these tubes tightened a rubber gland against the side of the hole. This seal was capable of withstanding a pressure of 2,800 lb./sq. in. After the pre-cementation of the Oaks Rock the make of water from this length was negligible (1-1½ gal./min.).

Insets and Mouthings

The original programme envisaged the construction of insets as they were reached, but it was agreed at the contractor's request, to sink straight through. Inset construction was to follow the completion of sinking so that the rhythm of sinking would not be broken. A further advantage was that, since the construction of insets involves a considerable reduction in manpower, the revised programme obviated the laying off of men for short periods. It was, however, necessary to construct the inset mouthings and to install a temporary safety wall (Fig. 12).

The insets are to be supported by reinforced concrete and the shaft wall in the vicinity of the inset is also heavily reinforced (Fig. 13). The reinforcement consists largely of 1-in. dia. mild steel bars and is erected under the supervision of the resident civil engineer.

Insets are to be constructed as shown in Table 3.

TABLE 3.—*Dimensional Details of Insets.*

Inset.	Dimension.	Depth from surface.
		ft. in.
Shafton	10 ft. by 10 ft. square	563 0
Beamshaw ventilation	24 ft. by 16 ft. high cambered roof	1,590 0
Dunsil ventilation ..	,, ,, ,, ,,	1,920 0
Manriding and ventilation	,, ,, ,, ,,	2,212 6
Skip pocket	24 ft. by 19 ft. 3 in. ,, ,,	2,246 6
Spillage	10 ft. by 8 ft. ,, ,, ,,	2,411 0

The sump is at a depth of 2,435 ft. with an 18-in. concave concrete base. Water garlands are installed over every inset and at intervals of 100 yd. Each inset is to be constructed from a false bottom, to be installed at the floor of each inset. It will be formed by the expanding ring which has been considerably strengthened to this end. The grab

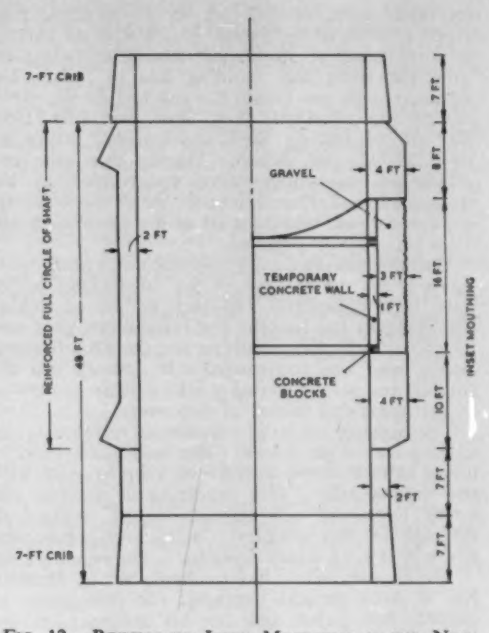


FIG. 12.—REINFORCED INSET MOUTHING IN THE NEW No. 3 SHAFT AT SOUTH KIRKBY COLLIERY.

scaffold will be secured some 100 ft. from the shaft bottom and will form the anchorage for the guide ropes of the sinking hoppits.

Progress

Table 4 shows the rates of sinking and the cubic footage per manshift of men employed in sinking.

TABLE 4.—*Summary of Monthly Sinking Progress.*

Month.	Advance.	Cub. ft. per man shift employed on sinking.
	ft.	
April, 1958	81	62
May, 1958	54	54
June, 1958	90	68
July, 1958	52	69
August, 1958	132	96
September, 1958 ..	138	141
October, 1958 ..	69	144 up to fall
November, 1958 ..	204	143
December, 1958 ..	126	133
January, 1959	—	—
February, 1959 ..	129	125
March, 1959	156	128
April, 1959	225	146
May, 1959	216	156
June, 1959	213	157
July, 1959	252	178
August, 1959	130	174
September, 1959 ..	108	180
	2,375	
Average	132	

Conclusions

Many difficulties were met in the early months of sinking. Despite these, the shaft was sunk to

its final depth of 812 yd. in 17 months, from April 1, 1958, to September 25, 1959, at an average approximately of 50 yd. per month, excluding the time the shaft was standing due to falls. The advance made per month has reached 84 yd. Over the months of April, May, June, and July, 1959, 302 yd. of sinking were accomplished averaging over 75 yd. per month. During this time two reinforced mouthings were constructed at the Beamshaw and Dunsil insets. Also old workings were negotiated and secured at the Beamshaw and Top Haighmoor horizons.

Had the sinking during July been straightforward there is no doubt that 94 yd. of sinking would have been completed. In fact, 84 yd. of sinking was done in the month; the Haighmoor goaf was negotiated and the mouthing for the Dunsil ventilation inset was constructed. It appears that the sinking and all associated works will be completed in the stipulated period of two years.

The sinking cycle is capable of producing an 11-ft. advance per 24 hr. The modified system of lining is more than capable of keeping pace with the sinking rate. This simultaneous sinking and lining technique can be successfully applied to sinkings in this country, particularly where the strata is dry or where freezing is employed.

The authors would like to thank Mr. C. Machin, No. 4 Area general manager, for permission to publish this paper and for his guidance in the preparation of it. Special thanks are due to the chief mining engineer of Haniel & Lueg, Herr von der Linden, to Dr. Rudroff and their official staff for their co-operation throughout the sinking, and for information supplied in compiling the paper. Finally, acknowledgment is made to the assistance given by HM Inspectorate, South Kirkby Colliery officials, Area No. 4 and divisional staffs of the North-Eastern Divisional Coal Board, and by Mr. H. Smith, sinking manager. The views expressed in this paper are those of the authors and not necessarily those of the National Coal Board.

FIG. 13.—REINFORCING THE SHAFT WALL IN THE VICINITY OF THE INSET.

DISCUSSION

MR. C. N. RATCLIFFE, branch president, asked whether rigid or rope guides would be used for skip-winding, and what provisions would be made during shaft lining for receiving guide buntons if rigid guides were used.

Replying, the AUTHORS said rope guides were to be used; therefore there were no rigid guides requiring buntons.

In reply to MR. R. A. MACDONALD, the AUTHORS said the shaft was truly vertical. The cactus grabs cleared the debris over the whole sump floor since the grabs were traversed across the shaft by carriages running on rails mounted on the grab scaffold controlled from the shaft bottom.

MR. F. FAIRCLOUGH, concerned about water entering the shaft, asked if any difficulty had been experienced in completing the joints of the lining which would be in a soft or plastic state and liable to settle to the previous length of lining which would be solid.

When joining up two lengths of lining, replied the AUTHORS, the concrete was vibrated to the back of the closure. The climbing shutter was so designed that it was set back 4 in. at the top and travelled a few inches above the joint and thus concrete could be poured and the joint completely closed. This left a 4-in. ring of concrete proud of the joint and shaft wall and this was trimmed off later by jigger pick, leaving a continuous joint. Leakage of water at the joints had not occurred and was not expected, and no rubber or plastic seal was used at the joints. Replying to MR. A. JACQUES, who asked what method was used to get the concrete over the top of the shuttering at the inset, the AUTHORS said a concrete placer or pressure kettle was used at the insets. Into this, compressed air was admitted at sufficient pressure to force the concrete mix by a mobile pipeline to any point over the shuttering in constructing the roof. The pressure applied impacted and stowed the concrete solidly into the cavities.

Degree of Error

MR. H. P. A. JOHNSON asked, in connection with the symmetricity of the shaft, what degree of error was permitted to the contractors, and what corrective measures were taken in the event of an error occurring. He also asked if consideration was given at any time to mains shotfiring, and the point at which the shaft sinking was regarded as a "Quarry" and then a "Mine" for purposes of the Mines and Quarries Act. Mention had been made in the paper of an 11-ft. pull and daily advance of the same amount. Mr. Johnson was interested to learn if the concreting was completed at this speed and if it was possible to increase still further the speed of concrete lining.

Replying, the AUTHORS said no error was permissible to the contractor in connection with the shaft

alignment. The method of centring the levelling, ensured that each crib was installed perfectly correct. The shaft was absolutely vertical and to a minimum of 24 ft. dia. Consideration was given to mains shotfiring, but it was held that no advantage would have been gained by adopting it. The results obtained using the Beethoven exploder had proved very satisfactory.

The surface excavations were not regarded as a notifiable quarry under the Mines and Quarries Act, 1954, while the shaft collar and fan drift were being constructed. As soon as the headgear and winding engine were erected and sinking operations proper commenced the sinking was deemed to be a separate mine under its own manager. The lining of the shaft could be placed at the rate of 22 ft./24 hr. if required, which was twice the rate of sinking.

MR. N. BASTER, who understood that winding was to be by the Koepe system, asked what factors influenced the decision to put in a ground-mounted winder rather than a tower-mounted one.

The AUTHORS replied that discussions on the form of winding to be used took place at Area, divisional, and national levels. The factors influencing the decision to install a ground-mounted winder were very involved and these could well form a separate paper. They were unable to give the reasons in sufficient detail in the short time available.

MR. H. HARTLEY said that mention had been made, in describing the process of cementation, of an expanding gland, and asked if the purpose of this was to inject cement into the holes in stages starting at the bottom. He also asked if this eliminated the need for a stand pipe. Replying, the AUTHORS said that when injecting the 49-ft. and longer holes, injection tubes were cemented in at the top of the holes extending 18 in. to 2 ft. above the floor of the sump. The full length of the holes was then injected through the injection tubes up to pressures of 450 lb./sq. in. The injection tube consisted of two concentric tubes moving one within the other by means of a screw. The extension of these tubes tightened a rubber expanding gland against the side of the hole, and the seal made was capable of withstanding a pressure of 2,800 lb./sq. in.

In reply to MR. A. JACQUES, who asked if there was any record of the average amount of powder used per round of shots, the AUTHORS replied that the number of shots and quantities of explosives used were recorded on the daily report sheets.

In reply to a question from DR. V. SIMONS the AUTHORS said their method study staff was not employed at the sinking. The contractor was responsible for the actual operation. Their suggestions were put forward and so were the contractor's and the changes were mutually agreed. The methods originated in Germany and Holland. They were altered as a result of experience and difficulties encountered.

Narrow Drum for Sinking

MR. C. N. RATCLIFFE said some members were intrigued with the narrow rope tread of the winding engines, and asked if it was fairly common on the Continent. Replying, HERR H. HOFFMANN, of Haniel & Lueg, said it was fairly common in Germany to use the narrow drum for sinking only because it was easy to have a large amount of rope in a relatively small space. Narrow drums could carry large amounts of rope, up to 1,200 metres in length; it was easy to extend the ropes, and it had the mechanical advantage of picking up the loaded hoppit on the small diameter.

MR. C. N. RATCLIFFE also asked how long this lining process had been in existence.

In reply to a further question by Mr. Ratcliffe, MR. HUIZING (Laeven & Company) said the process had been used for about five years. There was a shaft in Holland as early as 1954 using this sliding shutter system. This method was usually adopted in frozen ground.

MR. K. HOWARD asked if it was the original intention to transport the concrete by pipes to the shaft bottom throughout the whole period of the sinking. Replying, the AUTHORS said it was intended to transport the concrete by pipeline. After a time the quality of the concrete so placed proved to be unsatisfactory to the contractors. The relatively dry mix caused pipe blockages and bursts were frequent. In order to achieve fluidity of the concrete too much additional water was necessary. This wetter mix fouled the lining platforms, climbing ropes, and wedges, and slowed down the lining operations. The concrete climbing shutter required a fairly dry mix. The contractor's own high standards for their concrete was mainly responsible for the change.

MR. H. HARTLEY asked if concrete placed by pneumatic means was as good as that placed by hoppit. He had used a pneumatic placer, but he was not clear whether this concrete was as good as that placed from a hoppit. In reply, the AUTHORS said that hoppit-placed concrete started off with a big advantage over pipe concrete. When the pipe length was short a relatively dry mix could be successfully placed. Over longer lengths a wetter mix was necessary and segregation might occur, while too much water reduced the strength of the concrete.

Film Review

Maintenance of Conveyor Belting

SELECTION of the right belt, its installation, and its care and maintenance; these are the three factors upon which the effective life of a conveyor belt very largely depends, and a film, "The Care and Maintenance of Conveyor Belting," produced for Dunlop sets out to stress the importance of these factors.

The stages of manufacture are first explained and a comparison made with rubber belting to show that, layer for layer, p.v.c. is stronger, more flexible, and does not support combustion. The correct methods of cutting, preparing, and, finally, joining and splicing the ends of the belt are demonstrated. The importance of proper handling, transporting, and storing are emphasized, followed by a sequence showing the preparation of the belt before it is laid on a conveyor system.

With the assistance of the National Coal Board, it is possible to see the surveying and eventual laying of the conveyor belt in the mine.

The film, of interest to mining and factory management, engineers, and also to general industrial audiences, is available in 16-mm. black and white, is non-inflammable, and is not suitable for silent projectors. It has a running time of 29 min. Produced by Technical & Scientific Films, Limited, it is available without charge from the Dunlop Film Library, Wilton Crescent, London, S.W.19.

New Literature

NEW catalogues, booklets, and other publications which have recently been received include those mentioned below. Readers interested in obtaining a copy of any of the publications referred to should apply direct to the addresses given, at the same time mentioning IRON AND COAL.

NATIONAL SOCIETY FOR CLEAN AIR, Palace Chambers, Bridge Street, London, S.W.1—Smokeless Air, the society's journal, breaks new ground in its summer issue with the introduction of an international section.

VICTOR PRODUCTS (WALLSEND), LIMITED, GPO Box No. 10, Wallsend-on-Tyne—Leaflets (Nos. P2200 and P2300, respectively) deal with the 30-A plug, socket, and coupler, and the 15-A flameproof plug and socket.

GOODYEAR TYRE & RUBBER COMPANY (GREAT BRITAIN), LIMITED, Wolverhampton—An illustrated article on the steel industry is among the contents of the June issue of the Goodyear Industrial Products News.

BROOK MOTORS, LIMITED, Empress Works, Huddersfield—The Brook Magazine is a small, but attractive, quarterly. The contents are well varied, the accent being on the role played by the company's products in industry.

CRAVEN BROS. (MANCHESTER), LIMITED, Vauxhall Works, Reddish, Stockport—This company's "calendar year" commences on July 1. Photographs of Craven machinery are used to illustrate the monthly wall calendar.

U.A.M. GROUP ADVISORY SERVICE, Tolpits, Watford (Herts)—The fifth catalogue in the new U.A.M. group series deals with magnum sheets which have a bold profile and are suitable for the roofs and walls of large-scale industrial buildings.

THOS. FIRTH & JOHN BROWN, LIMITED, Atlas Works, Sheffield 4—The summer number of Firth Brown News is filled with interesting features and news from the works. Many photographs are included and do much to make this one of the most attractive magazines in its field.

HUNSLET ENGINE COMPANY, LIMITED, Hunslet Engine Works, 125, Jack Lane, Leeds 10—A brochure (Report No. 99) has been issued describing the Hunslet MT.25 flameproof diesel hydraulic mines tractor. The tractor was the subject of an article in the May 27 issue of IRON AND COAL (p. 1204).

KEITH BLACKMAN, LIMITED, Mill Mead Road, London, N.17—The third edition of Publication No. 37 is the first fully descriptive catalogue issued to describe the company's range of Type AR, aerofoil section, backward bladed centrifugal fans. The earlier editions were in leaflet and folder form.

CROSSLEY BROS., LIMITED, Openshaw, Manchester 11—The latest issue of Crossley Chronicles describes the works of the Hanningfield Water Joint Managing Committee at which two alternators driven by Crossley diesel engines are installed to provide power in the event of electrical main's failure.

WILLIAM JACKS & COMPANY, LIMITED, Winchester House, Old Broad Street, London, E.C.2—The company's annual special review of the iron and steel trades has been published for 1959. In addition to the usual commentary on the trend of the industry, there are useful statistics and other material.

VISCO ENGINEERING COMPANY, LIMITED, Stafford Road, Croydon—Descriptions of the various types of evaporative coolers in current use and illustrations of typical plants supplied by the company are given in "Visco Water Coolers" (brochure No. 603). Seven pages of meteorological information and several tables are valuable features of the publication.

GEORGE COHEN 600 GROUP, LIMITED, 600, Wood Lane, London, W.12—Few publications from industry attract more interest than the 600 Magazine, the summer number of which contains the usual well-varied contents list. Colour photography is used extensively, while no issue of the "600" would be acceptable without generous examples of the skill of the cartoonist.

BRITISH IRON AND STEEL FEDERATION, Steel House, Tothill Street, London, S.W.1—The May issue of Safety, the magazine published by the federation's Accident Prevention Committee, includes an article on the achievement of the Panteg Works of Richard Thomas & Baldwins, Limited, in being able to return an accident frequency rate of 0.47 in 1959—"probably the lowest in the steel industry."

STEWARTS AND LLOYDS, LIMITED, Pipework Engineering Division, Broad Street Chambers, Birmingham 1—"Industrial Pipework" is the title of a new brochure issued by the company's pipework engineering division. It has been compiled to assist engineers and all who are concerned with the design or purchase of pipework. Fully illustrated, it contains a wealth of information of a general character besides dealing specifically with the services that the division has available.

J. H. FENNER & COMPANY, LIMITED, Hull—The company's V-belt Journal, the June number of which is to hand, was entered in the national house journal competition organized by the British Association of Industrial Editors. In awarding it a certificate of merit for coming second of 21 entries, the judge said, *inter alia:* "There is an endearing air of genuineness about the whole production. . . . The keynote of the whole journal is not merely that Fenner's know their stuff; they must be jolly good people to deal with."

US Ferrous Scrap and Pig-iron Consumption

DOMESTIC use of ferrous scrap and pig-iron combined in the US in 1959 totalled 127,800,000 short tons, 13 per cent. greater than in 1958, according to the Bureau of Mines, US Department of the Interior. This increase was attained despite a 116-day steel strike, and was largely the result of a big demand for these materials during the first half of the year and a record quantity used in December.

The use of ferrous scrap for all purposes rose 17 per cent. over 1958; the January-June total of 41,800,000 short tons of scrap was the highest quantity used for this six-month period since 1956. The 7,900,000 short tons of scrap used during December was the peak month for 1959 and the largest quantity that has been consumed during any one month, according to records of the bureau.

Total stocks of ferrous scrap held by all consumers during 1959 fluctuated between a low of 9,181,000 short tons at the end of February to a record high of 9,993,000 short tons on December 31. The record quantity of stocks was equivalent to a 55-day supply at the 1959 average daily consumption rate.

Open Days at British Steel Castings Research Association

THE EXPERIMENTAL FOUNDRY OF THE BRITISH STEEL CASTINGS RESEARCH ASSOCIATION, WHICH HAS BEEN EXTENDED IN LENGTH BY 45 FT. DURING THE PAST YEAR.

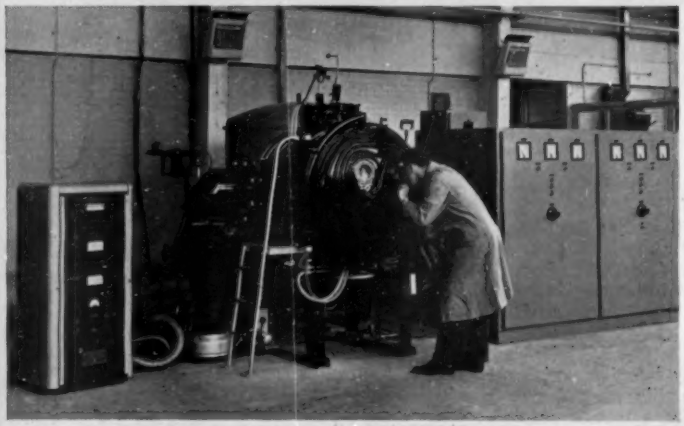
NOTABLE additions have been made at the British Steel Castings Research Association laboratories in Sheffield during the past year, and the open days held there on Tuesday, Wednesday, and Thursday of last week provided for many of the visitors their first opportunity for inspecting the changes.

An extension to the research station has resulted in the addition of 10,000 sq. ft. of laboratory and foundry floor space. The metallurgy laboratory has been transferred from the foundry building to the new first floor of the office building and now has a gases-in-steel laboratory. In the foundry building the foundry bay has been lengthened by 45 ft., the machine shop and the mechanical test laboratory have been enlarged, the sands laboratory and the chemistry laboratory have been re-sited and substantially enlarged, and an isotope laboratory has been added.

New Equipment

The main new items of equipment are a 56-lb. capacity vacuum melting furnace of GEC-Viavac manufacture and apparatus for the determination of hydrogen and nitrogen in steel, while vacuum fusion equipment for oxygen determination is on order. A 2.5 Curie caesium isotope source and handling equipment is provided for the isotope laboratory. A fettling bench of BSCRA patented design incorporating features for dust and noise control is on permanent loan from one of the licensed manufacturers, Newton Collins, Limited.

The current work of the association was effectively demonstrated to visitors. For instance, in an enclosure for the demonstration of noise reduction the visitor was invited to pick up a telephone and listen to the results on a study of fettling methods. He was able to compare the din of a conventional fettling method with the much reduced noise when doing the



THE 56-LB. CAPACITY VACUUM ELECTRIC INDUCTION FURNACE RECENTLY INSTALLED BY GEC-VIAVAC IN THE LABORATORIES OF THE BRITISH STEEL CASTINGS RESEARCH ASSOCIATION.

same fettling job by means of special equipment devised by BSCRA. A 50 per cent. reduction in noise level is claimed. Many people are apt to adopt a defeatist attitude towards noise abatement, but the work at Sheffield shows that much can be achieved by simple and inexpensive devices.

"Let's Clear the Air," a 30-min. film made by the association, was shown to visitors. The association's contributions to atmospheric dust control and the difference between good and bad practices in foundries are well brought out in the film, which is available on loan.

A list of current researches is appended. Abstract reports are given, by way of example, on two, and information about all of them is contained in the 7th Annual Report, 1960, of the association.

STEELMAKING

Oxygen Injection for Carbon Removal

As a result of studies in many foundries the association has drawn up control charts which define, for various bath temperatures, the amount of oxygen to be injected to produce a predetermined reduction in the carbon content. Further foundry trials having substantiated their validity, the charts have now been issued as a handy pocket-size glazed card that will withstand the rigours of use in an electric melting shop.

Since adequate oxygen metering equipment is necessary to apply the results of this work to routine steelmaking in foundries, a survey has been made of the various instruments available for this purpose. By using a pressure regulating valve and a simple integrating meter, it is possible to provide adequate metering facilities for as little as £130.

The application of this technique. which offers the possibility of considerable economies in the use of oxygen and re-carburizing additions, is an obvious step in the many foundries which already inject oxygen for carbon removal.

Surface Quality of Steel Castings

A method of labelling silica sand by coating the grains with CeO_2 and irradiating the sample in an atomic pile has been developed in collaboration with the Isotope Division, AERE, Harwell, and has been used to study mould erosion during the pouring of a casting. The location of the eroded material was determined by autoradiography of the sectioned casting. The autoradiographs showed that the greatest amount of activity was located at the outside of the casting as surface defects. Further activity was located near the top and bottom of the shrinkage pipe and a little near the bottom face of the casting.

It was found that the inclusions that exhibited radioactivity consisted of relatively inactive grains of silica embedded in a non-metallic matrix, to which the activity had probably been transferred. It was considered most likely that these active inclusions were formed by reaction between the labelled sand and some non-metallic material present in the steel, *e.g.*, slag or a deoxidant product. On the other hand, it appeared quite possible that similar, though inactive, inclusions could have been formed by reaction with initially active grains that had lost their activity, *e.g.*, by losing their ceria through solution in liquid steel, or by reaction with other non-metallic material. Further work is in hand to elucidate the exact mechanisms concerned.

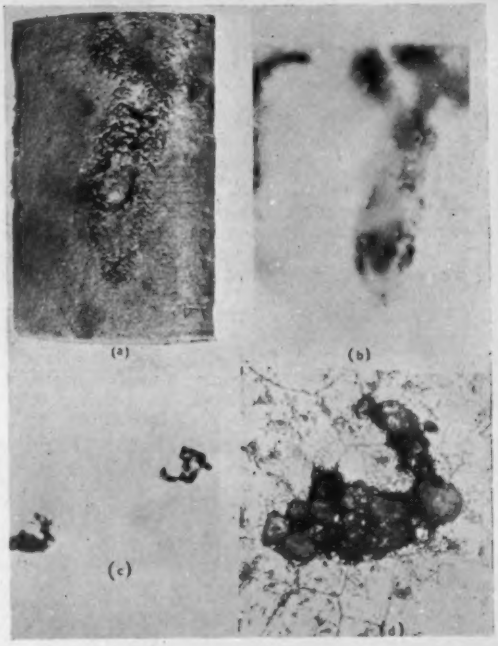
List of Current Research Projects

STEELMAKING

Oxygen injection.
Desulphurization of liquid steel.
Pinhole porosity.

FOUNDRY PROCESSES AND MOULDING MATERIALS

Factors affecting the surface quality of steel castings.
Factors affecting the soundness of steel castings.
Moulding sand compaction.



THE EROSION OF SAND IN A MOULD BY MOLTEN STEEL WAS TRACED BY MEANS OF AUTORADIOGRAPHIC TECHNIQUES, INVOLVING THE COATING OF SILICA SAND GRAINS WITH CERIUM OXIDE. THE CERIA-CONTAINING SAND COMPACT WAS THEN ACTIVATED AND PLACED IN POSITION IN THE EROSION TEST MOULD. THE "CEROXIDE" TYPE OF INCLUSION AT THE SURFACE OF THE CASTING IS SHOWN IN (*a*), AND AN AUTORADIOGRAPH OF AN IDENTICAL AREA (*b*) SHOWS THAT THIS SURFACE DEFECT IS RADIOACTIVE. AN AUTORADIOGRAPH (×12) OF AN INCLUSION IMMEDIATELY BELOW THE SURFACE OF THE "CEROXIDE" DEFECT APPEARS IN (*c*), AND (*d*) IS A PHOTOGRAPH OF THE LEFT-HAND INCLUSION TAKEN WITH POLARIZED LIGHT (REDUCED BY ¼ ON REPRODUCTION).

CO_2/sodium silicate process.
Exogenous inclusions in steel castings.
The foundry properties of steels with low sulphur contents.
Data sheets on moulding sands.
Mould and core bonding agents.

METALLURGY

Microporosity in steel castings.
Heat treatment of steel castings.
Physical data on cast steels.
Intergranular fracture in steel castings.
Interdendritic segregation in high-tensile cast steels.
High-temperature properties of cast steels.
Factors affecting the properties of cast 13 per cent. Cr steel.
Deoxidation of cast steel.

PLANT ENGINEERING

Sand reclamation.
Efficiency of blast cleaning.
Atmospheric pollution from steelmaking processes.
Factors affecting the efficiency of mould drying.
Removal of excess metal from steel castings.

INDUSTRIAL HEALTH

Assessment of atmospheric dust in foundries.
The efficiency of dust collectors.
Noise abatement in foundries.
Silicosis hazards in steelfoundries.

NON-DESTRUCTIVE TESTING

Ultrasonic examination of steel castings.

New Patents

PATENTS below are among the complete specifications accepted listed in the Official Journal (Patents). The numbers given are those under which the specifications have been printed and all subsequent proceedings will be taken.

Applications for copies of the full specifications (3s. 6d. each, post free) should be made to the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

Mining and Mining Appliances

834,214 HARDYPICK, LIMITED. Extendible feed leg for rock and like drilling machines.
834,277 EDGEMANN, W., and CAMPENHAUSEN, VON E. (trading as SCHWARZ KOMM.-GES. H.) Hydraulic props, particularly mine props.
833,903 EQUIPMENT MENIER. Winning apparatus for mining mineral products.
834,537 BOLTON, R. B. Hydraulic stand for collapsible chocks for use in mines.
834,421 MINE SAFETY APPLIANCES COMPANY. Quick starting oxygen-producing apparatus.
834,429 SKIP COMPAGNIE G.m.b.H. Skips for shaft-winding installations.
834,708 MATTHEWS, G. B. Coal, rock, and like drilling or boring tools.
834,613 MUSCHAMP & COMPANY, LIMITED, N. J. Pick for cutting machines used in mines.
834,753 MATTHAEI, C., and MATTHAEI, jun., C., (trading as MATTHAEI METALLWARENFABRIK, C.). Hooks or staples for connecting adjacent ends of conveyor belts or the like.

Metallurgy and Engineering

832,958 KOPPERS G.m.b.H., H. Decarbonizing of the rich gas nozzles of coking chamber or other regeneratively-heated ovens.
833,486 BRITISH CAST IRON RESEARCH ASSOCIATION. Manufacture of engineering components and of grey cast iron therefor.
833,487 SCHIEKER, W. H., [trading as WALZWERKE NEVIGES W. H. SCHIEKER & COMPANY.] Process and apparatus for improving the qualities of sheet metal, more especially sheet metal for use in electrical equipment.
833,522 ROLLS-ROYCE, LIMITED. Manufacture of turbine blades from heat-resisting alloys.
833,698 FISCHER, A. Idler rollers for endless belt conveyor assemblies.
833,567 GILLOTT, J. M. Handling machines for coke-oven doors.
833,782 SALEM ENGINEERING COMPANY, LIMITED. Continuous heat-treatment furnaces.
833,536 ARMCO INTERNATIONAL CORPORATION. Austenitic stainless steel.
834,234 PATENTVERWERTUNGSGESELLSCHAFT FÜR EISEN UND METALLE. Process and device for the production of high-quality castings.
834,218 ALLEGHENY LUDLUM STEEL CORPORATION. Age hardenable austenitic alloy and articles employing same.
834,297 DAVEY, PAXMAN & COMPANY, LIMITED. Induction hardening of metal articles.
834,141 KNAUST, H., and KRITTER, VON U. Conveyors having jointed plate belts.
834,042 UNITED STATES STEEL CORPORATION. Reduction of oxidic iron ores.
834,043 S.P.N.M. SOC. POUR L'EXPLOITATION DE PROCEDES NOUVEAUX METALLURGIQUES. Blast furnaces.
833,925 BOCHUMER VEREIN FÜR GUSSSTAHLFABRIKATION A.G. Process and apparatus for the vacuum treatment of steel or steel alloy.
834,783 UNITED STEEL COMPANIES, LIMITED. Apparatus for controlling the continuous casting of metals.
834,823 BABCOCK & WILCOX, LIMITED. Slag receivers for the reception of slag from slag tap furnaces and in means for discharging slag from furnaces.
834,897 FARBWERKE HOECHST AKTIENGESELLSCHAFT, VORM. MEISTER, LUCIUS, & BRÜNING. Surface treatment of iron and steel and solutions for use therein.
834,909 DEMAG A.G. Method of casting steel and cast iron and mould for carrying out the method.
834,924 WIGGIN & COMPANY, LIMITED, H. Production of wire or rod by extrusion.
834,681 IMPERIAL CHEMICAL INDUSTRIES, LIMITED, CARTER, A., and KEMP, R. E. Melting of refractory metals.
834,834 MUIRHEAD & COMPANY, LIMITED. Surface blackening process for steels.

Fuel Treatment and Utilization

834,129 COAL INDUSTRY (PATENTS), LIMITED. Dry cleaning of coal.
834,130 COAL INDUSTRY (PATENTS), LIMITED. Methods of screening solid material.

HEAD WRIGHTSON

Rotary Dryers for RTB Plant

SIX rotary dryers for an iron-ore drying plant costing approximately £240,000 are being supplied by Head Wrightson Stockton Forge, Limited, a subsidiary of Head Wrightson & Company, Limited, Thornaby-on-Tees, to Richard Thomas & Baldwins, Limited. Three of these machines, each of which measures 45 ft. long by 10 ft. in diameter, will be installed at the Redbourn Works and three at the Spencer Works of RTB.

Each installation is capable of handling a weekly output of 21,350 tons of ore, processing from 0 to 2½ in.

The rotary dryers are arranged in parallel flow and each has a rated capacity of 50 ton/hr. when drying from 20 per cent. moisture down to 9 per cent.

It is believed that the machines will be the most highly instrumented of their kind in this country.

The maximum temperature of dried ore is approximately 200 deg. F. with the maximum temperature of exhaust gas, prior to the dust separator being 210 deg. F., and at the exit from the collectors about 200 to 205 deg. F. The efficiency of the dust collectors is such that with an inlet dust content of 18 to 20 grain/cu. ft. gas, the outlet dust content would be no more than 1 grain/cu. ft. The fan is rated at 37,000 cu. ft./min., approximately 230 deg. F. against a resistance of 9 in. w.g.

The dryers are fitted with automatic temperature controls, which will ensure a constant entry and exit gas temperature for a variable feed or feed moisture content. Any variation, therefore, will obviously require an increase or decrease in the heat transfer rate, so that to maintain the gas entry and exit temperature, automatic adjustment is made to the gas primary air valves, linkage, and dilution air valve. These controls will ensure within limits, a constant predetermined product moisture content.

For these variable gas and air rates the exhaust fan is fitted with a damper control. For optimum conditions this fan should be capable of drawing the waste gas and steam through the system, without creating any undue negative pressure at the open feed chute.

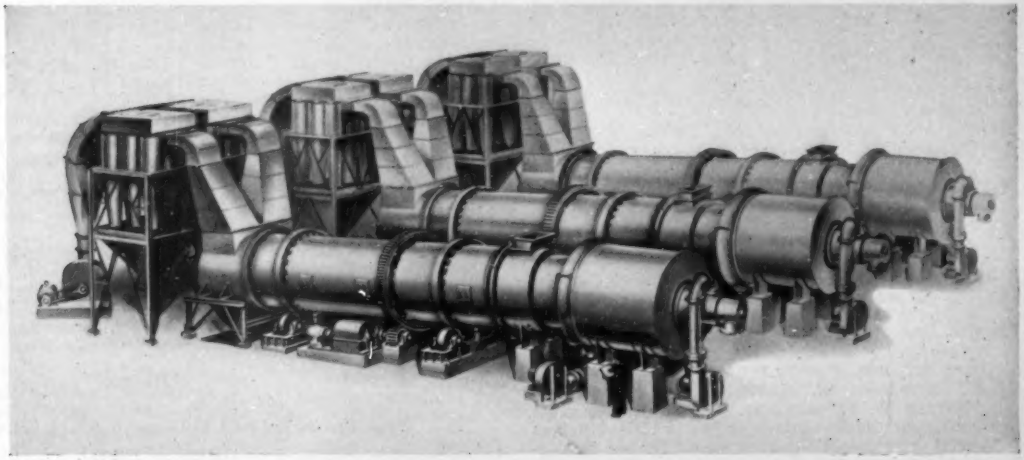
This control is effected by having the fan damper controlled from pressure points in the vicinity of the feed chute.

Greece to Build £27,000,000 Aluminium Plant

PRELIMINARY agreement has been reached between the Greek Government and an international consortium for the production of aluminium from local bauxite.

The project, which is the most ambitious ever to be undertaken in Greece, is to cost $75,000,000 (about £27,000,000), of which Greece will contribute a loan of $10,000,000. The consortium consists of the French firm of Pechiney and the Greek shipowner, Mr. Stavros Niarchos, who will probably be working in partnership with the American industrialist, Mr. Richard Reynolds.

The plant to be built will produce 100,000 tons of alumina a year which will be converted into aluminium at a rate of 52,500 tons a year.



AN ARTIST'S IMPRESSION OF THE ROTARY DRYERS INSTALLED AT THE REDBOURN WORKS OF RICHARD THOMAS & BALDWINS, LIMITED.

Iron Desulphurization by Gazal Process

IN the Gazal process for desulphurizing hot metal compressed air or nitrogen is introduced into the molten bath by means of a porous refractory plug in the bottom of the ladle, thus causing turbulence which accelerates slag-metal reaction. Invented by M. Etienne Spire, Gazal desulphurization tests were carried out by the Société des Acièries de Pompey, France, in collaboration with the Société Air Liquide, owner of the Gazal patents. The process was described in an article in the Journal of Metals (March, 1960).

In practice, four porous plugs are arranged, as shown in Fig. 1, in the bottom of a silico-alumina

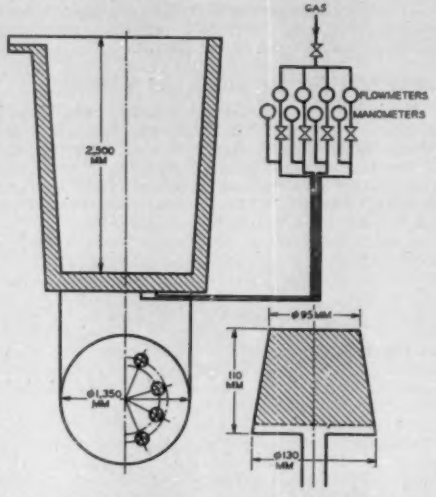


FIG. 1.—ARRANGEMENT OF THE FOUR POROUS PLUGS.

lined ladle. Deslagged hot pig-iron is poured into the treatment ladle, the bottom of which has been covered with a mixture of sodium carbonate and sodium chloride to insure a liquid slag. During pouring, a light flow of gas is maintained through the plugs. After pouring, gas flow is increased through the plugs to 9 cub. m./hr. for each plug, treatment continuing for 10 min. Deslagging follows, a light flow of gas being maintained during this operation to agitate the metal and move slag towards the spout. In earlier tests, nitrogen was used in a quantity of 0.3 cub. m./metric ton of iron treated, but in later experiments compressed air at 85 lb./sq. in. was used. But due to the small quantity used, the change from nitrogen to compressed air did not show any reductions in the rate of desulphurization.

With iron containing less than 0.100 per cent. S, from 11 to 22 lb. of sodium carbonate per metric ton of pig-iron was necessary, desulphurization being between 70 and 90 per cent. A slight increase in desulphurization was observed with more carbonate, but 13 lb./ton was found sufficient to ensure 0.020 per cent. S or less. With iron resulphurized to between 0.100 and 0.200 per cent. S, 17 lb. of carbonate per ton was added, desulphurization ranging between 70 and 80 per cent., the average change being 0.110 per cent. S.

As the quantity of sulphur eliminated increases with temperature, it is advisable to treat the metal before pouring into a mixer. Desulphurization increases when the hot metal is high in silicon, rates between 80 and 90 per cent. having been achieved when the iron analyzed 0.50 per cent. Si before treatment. Loss of silicon during treatment was generally found to be between 1 and 1.5 times the loss in sulphur. This remains constant whether nitrogen or compressed air is used. The cooling effect of the gas used in the treatment is considered to be entirely negligible.

The final slag, which is quite fluid and contains no metallic granules, has the following percentage analysis:—S, 7; FeO, 5; free SiO_2, 7; SiO_2, 26 in the form of silicate of soda, and CO_2 less than 1. Slag produced amounts to less than 44 lb./m. ton pig-iron, and iron loss is around 2 lb./ton.

Results from more than 100 experimental heats, suggest that the process is entirely suitable where a large amount of desulphurization is necessary, such as pig-iron from acid blast furnaces. While it is known that desulphurization increases with increasing silicon content, no experiments have been run with silicon greater than 1 per cent. and that could be an interesting area for further work.

Statistical Summary of Mineral Industry

THE Statistical Summary of the Mineral Industry (World Production, Exports, and Imports), 1953-58, prepared by the Mineral Resources Division, Overseas Geological Surveys, and published by HMSO (price 27s. 6d.), is an annual publication of statistical tables covering a period of six years showing world production, exports, and imports of all the important economic minerals and metals. Production tables for cobalt, copper, lead, tin, and zinc give not only the output of the relevant ores in terms of metal but also the output of metal. Full available statistics are given for the minor metals which are becoming of increasing importance, such at lithium, niobium, tantalum, and titanium.

The sections on coal and petroleum are very comprehensive and include statistics of the production of and trade in by-products and refinery products. As the unit for both these fuels is the same, comparison is facilitated. Statistics for all the principal non-metallic minerals are also included. It is probably true that no other publication contains such a wealth of information on world exports and imports of minerals and metals, including not only the crude material but the chief semi-manufactured products, refinery products, and other derivatives.

New Equipment and Products

PVC Ducking Rollers

BECAUSE stainless steel strip during pickling must be completely immersed in a bath of nitric/HF acid, it is essential that ducking rollers are fully resistant to the chemical conditions and, at the same time, able to withstand the mechanical stresses involved. As the result of several years' research into the possibility of providing a roller with a plasticised PVC outer skin, Tanks & Linings, Limited, Droitwich (Worcs), in close association with one of the leading stainless steel producers, has developed a ducking roller which is fully protected against chemical corrosion.

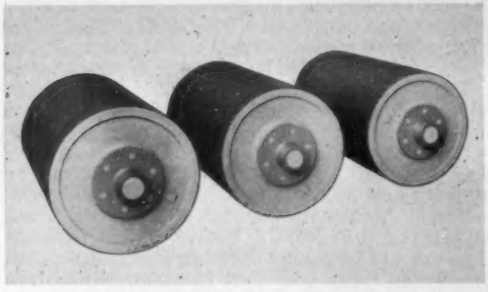


FIG. 1.—PVC DUCKING ROLLERS.

The rollers (Fig. 1) are constructed almost entirely from rigid PVC and there are no metallic parts whatsoever in contact with the pickling liquid. The stub shaft-ends run in carbon and PTFE bearings, but a variety of end conditions can be provided.

As high-quality strip must not be scratched or marked, it is an additional advantage that the PVC outer covering will not pick up and retain metal particles that cause damage.

New Hydraulic Excavator

ENTIRELY new hydraulic excavator has just been marketed by J. C. Bamford (Excavators), Limited, Rochester (Staffs). The machine, known as the JCB 4, supersedes the company's only other product, the Hydra-Digga/Loadall. The new machine is powered by a Fordson 52-h.p. engine and the bucket capacity is 30 per cent. more than the previous model.

An outstanding feature of the machine is its stability. This is achieved by lifting the excavator off its wheels when in operation, by a hydraulic mechanism, so that it rests on a 16-ft. wide frame. Apart from reducing strain on the suspension and transmission systems, this enables a full bucket load to be dumped 11 ft. away without causing the machine to shudder or tip. When in a raised position this frame has a 21-in. ground clearance, so that the plant will not easily become bogged down.

The excavator has a tear-out force of 22,000 lb., can dig to a maximum depth of 16 ft., and slew a load round in a 180 deg. arc and dump it 11 ft. away from the machine. The output is claimed to be 77 cub. yd. an hour. Using the face shovel, which has a tear-out force of 10,340 lb., 4,480 lb. of material can be lifted to a height of 14 ft. 8 in. and dumped at a height of 8 ft. 6 in., 11 ft. away. When in operation all the buckets supplied with the excavator are filled to capacity with each dig.

The great power of the hydraulic system is derived from a new vane-type pump with an output of 30 gal./min. at 1,650 lb./sq. in. The pump is fitted with a replaceable rotor cartridge and it is claimed that the pump unit can be dismantled and serviced on the site in 10 min. The hydraulic system has been standardized as far as possible so that six types of hydraulic ram seal and three sizes of digger hose only need be carried as spares.

A wide range of equipment can be supplied with the machine, ranging from a 1-ton jib crane to a 9.75-cub. ft. bucket. All of these are attached by means of a shaft secured with a split pin and a new bucket can be fitted in about 4 min. With its wide slewing arc, great power, and versatility, the machine should prove eminently suitable for quarrying, open-cast mining, and for re-handling ground stocks or spoilheaps.

Bending Machine for Tubes and Sections

NEW design of mechanical bending machine has been introduced by Chamberlain Industries, Limited, Staffa Works, Argall Avenue, Leyton, E.10. It is known as the "Staffa" Pedrick, manufactured in the US by the Pedrick Machine Tool Company, Philadelphia, but now to be made in this country under licence by Chamberlain Industries.

The machines have exceptionally smooth and fast operation and are suitable for bending pipe, tube, flats, rolled or extruded sections, and bar stock. A standard machine will bend pipe to a radius of three times the nominal bore, and tubes with wall thicknesses of 16 gauge or heavier, to a radius of three times the outside diameter. It will bend flat bars to a square corner, busbars edgewise to very small radii, and angles, channels, and structural shapes within the power limits of each machine.

The bender (Fig. 2) is a precision-made machine, the design being based on more than 30 years' research and experience. It utilizes the compression method of bending, consisting of a rotary head with a stationary

FIG. 2.—THE "STAFFA" PEDRICK BENDING MACHINE.

die and a rotating arm, which wipes the piece to be bent into the die. Mounted on a cast-iron or mild-steel base, the table, driven from the bottom, is about 30 in. from the floor and consists of a large spur gear mounted on a roller bearing, buried in the table top under a guard to prevent dirt and swarf from damaging the bearings. Powered by a motor-gear reduction unit, mounted under the table and controlled by a magnetic starter, push-buttons enable the operator to start, stop, and reverse the machine at will, while limit switches permit the machine, once started, to complete the desired bend, reverse, and then return to the starting position and stop, without manual attention. The machines are designed for safety and are mistake-proof if the limit switches are not removed. Moreover, they can be operated if necessary by unskilled labour. A range of "Staffa" Pedrick machines is available in capacities to bend pipe to BSS 1387, from ¼-in. to 6-in. normal bore, or equivalent sections.

Mechanically Operated Worm-gear Jacks

RANGE of worm-gear jacks consisting of eight units with capacities of from 2 to 100 tons and specifically designed for building into machinery and equipment where jacking duties are involved, has recently been introduced by the Consolidated Pneumatic Tool Company, Limited, 232, Dawes Road, London, S.W.6. Known as the Duff Norton 1800 series, these jacks are for mechanical operation, and can be connected by means of shafting and mitre gearboxes to lift in unison, even with an unevenly distributed load. They are self-locking and can be used to hold loads of several hundred tons in position indefinitely without creep.

Features of this jack (Fig. 3) include the use of heat-treated phosphor-bronze worm gear teeth, the use of Alemite grease nipples, and the absence of keying in the lifting screw, allowing the top to be bolted to the member being raised, thus preventing the jack from turning. A clockwise rotation is employed for lifting the load, the maximum worm-gear speed being 500 r.p.m. In the smallest and two largest jacks in the range a ball race and grease seal is fitted at each end of the worm, while for jacks of from 5 to 25 tons capacity, Timken taper bearings are used.

The closed height of this range of jacks lies between 5½ in. for the 2-ton model and 24 in. for the 100-ton unit. The base measurements increase in eight stages, according to the size of the model from 3½ in. by 7 in. for the smallest jack to 20½ in. by 24½ in. for the largest unit. The weights of the range, based on a 6-in. lift, lie between 17 and 1,200 lb., the extra weight of each additional 1 in. of lift in these sizes being 0.33 lb. and 9 lb., respectively. While the standard range can be supplied with lifts of up to 24 in., greater lifts can be supplied where required.

Apart from their use as lifting jacks, the units in this new range may be employed as linear actuators, to push or pull horizontally and to apply pressure in any required direction. For any of these duties, they may be either manually or motor operated and since all units have a common lifting speed, any combination of sizes may be employed together, operated through gearboxes and shafting from a common power source.

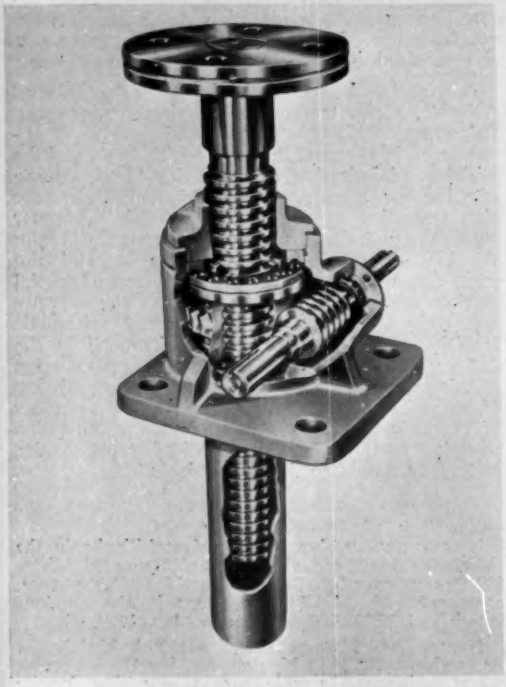


FIG. 3.—SECTIONAL VIEW OF DUFF NORTON WORM-GEAR JACK.

Automatic Coal Sampling

DEVELOPED to meet the need for accurate and automatic sampling, the Pollock sampler (Fig. 4), manufactured by International Combustion Products, Limited, London, W.C.1, can be readily applied to new and existing belt conveyor applications. The sampler is a simple, robust, and easily maintained unit with dimensions least likely to effect plant layout. A large number of samplers of this type are now in operation at power stations, coke ovens, and coal preparation plants.

The unit embodies a hinged scraper arm operated by a thruster or solenoid, depending on a.c. or d.c. supply.

FIG. 4.—POLLOCK SAMPLER, OPERATED BY AN A.C. THRUSTER.

The scraper, travelling along the width of the belt, removes a cross-section of the material and delivers it on to a side chute. The lower section of the scraper arm is hinged so that, during the return movement of the arm, the scraper rides back over the material being conveyed without disturbing it.

Normally, for belt widths up to and including 30 in. wide, a single thruster is used; above this width two thrusters are fitted.

The "Hydraulic Wheel"

CONSIDERABLE interest was shown in the "Hydraulic Wheel," a simple yet very efficient means of driving pedestrian and rider-controlled trucks of all descriptions, at the recent Mechanical Handling Exhibition at Earls Court. The "Hydraulic Wheel" is actually a slow-speed, high torque hydraulic motor with stationary shaft and a rotating crankcase which fits inside 12-in. dia. tyres. It is made by Hydrostatic Transmissions, Limited, London, N.20.

The standard model, as demonstrated at the exhibition in a truck by Eccles (Birmingham), Limited, develops a drawbar pull of 500 lb. when working at 4,000 lb./sq. in. It provides ample power for a truck of 3 tons capacity. The motor efficiency is stated to be 94 per cent.

Simplicity is the main feature of the unit, in which braking is automatic and which provides any speed beween 0 and 500 r.p.m. in either direction by operation of a single control lever. Smooth "inching" and creep speeds are readily obtainable. The prime mover can be petrol or diesel engine, battery-, or mains-operated electric motor.

SPECIAL-PURPOSE COMPUTERS FOR UKAEA

ORDER recently awarded to the English Electric Company, Limited, by the United Kingdom Atomic Energy Authority for temperature scanning equipment is now nearing completion. The first of these equipments is to be installed at Windscale and will be used for monitoring the fuel can temperature in the nuclear reactor plant.

Temperatures are measured by 1,250 thermocouples located at points associated with the nuclear reactor. The equipment scans the thermocouples in sequence and tests each in turn to ensure that the temperature lies within specified limits and gives alarm indication should this be exceeded. The alarm information produced will include the exact location of the off limit registering thermocouple as well as recording the temperature by which the set limit has been exceeded. The time of the occurrence is also noted and an automatic print-out of all the information is made for record purposes.

Steelmakers' Interest

Major organizations connected with steelmaking, power generation, oil distillation, chemical processing, and synthetic fibre manufacture have been considering similar applications of digital computers and digital systems to the control of their own particular processes. The control equipment must be capable of easy expansion on a modular basis to allow additional facilities such as more sophisticated data reduction, computation, and, ultimately, complete automatic control to be added as required.

For a number of years now the data processing and control systems division at Kidsgrove, Stoke-on-Trent, has been concerned with the development and marketing of this type of electronic equipment, and the building up of a general body of application information relating to these special purpose digital computers and industrial data processing systems.

For the various applications for which this equipment has been designed, which include such installations as minimum waste computers for steel mills, pipeline control computers, and barrel-filling control computers, English Electric has developed a system of "building bricks" which are easily interconnected. These bricks, called Datapacs, each of which comprises a particular logical element, permit the economic development of individually tailored computer systems to meet specific requirements. The present-day characteristics of transistors and other miniature components which the Datapacs embody have all had a bearing on the design concept and special consideration has been given to the flexibility of the units to cater for the most diverse applications.

Among the other applications already covered are:—(1) Computers for steel mill hot saw benches: These deal with one of the basic problems encountered in the steel industry, which is that of the effective minimization of waste due to the cutting of roller bar to customers' requirements. Here the high operating speed of an electronic computer makes possible the investigation of several different solutions, from which one resulting in minimum waste can be chosen. The main features of special purpose computers using the Datapac elements are that only the minimum storage and arithmetic facilities essential to the job are included in the design. (2) Oil pipeline control: A telemetering system which provides for automatic transmission of numerical information from points at a number of outstations. Remote control of the outstation pumping equipment, level control of storage tanks, and other remote facilities are included.

PRODUCTION OF bituminous coal and lignite in the US during May, according to the Bureau of Mines, US Department of the Interior, was 35,760,000 net tons, compared with 34,685,000 net tons in the previous month and 35,323,000 net tons in May, 1959.

NORTH VIET NAM celebrated the 70th birthday of its president, Dr. Ho Chi-minh, on May 19 by opening up at Naiphong, its main port, a new blast furnace with an annual capacity of 2,000 tons of pig-iron. This is the fifth blast furnace to be completed in the Republic since 1954.

Mining Engineers in Cardiff

SUMMER MEETING OF THE IME

The summer meeting of the Institution of Mining Engineers was held in Cardiff on Wednesday, Thursday, and Friday of last week under the presidency of Mr. R. G. Baker. The institution's 119th general meeting opened with an address of welcome by the Lord Mayor of Cardiff (Ald. Mrs. Dorothy Lewis).

TWO technical papers were presented. Dr. John M. Rogan, the National Coal Board's chief medical officer, contributed a paper on "Chest Disease in Coal Miners, with Special Reference to the Pneumoconiosis Field Research," the second paper being "Power Loading in South Wales and its Effects on the Degradation of Coal," the authors of which were Mr. G. V. Standerline and Dr. S. Islwyn Evans, mechanization engineer and chief scientist, respectively, of the South-Western Divisional Coal Board.

"Chest Disease in Coal Miners"

The history of chest disease in coal miners in this country was traced from the early 19th century, when the first medical reports appeared, to the present day by Dr. Rogan. The situation in South Wales, which led up to the undertaking of large-scale medical research by the Medical Research Council, was described and reference made to the more important results of this research and to the establishment of the council's pneumoconiosis research unit.

Approved conditions were discussed and also the need for further research into the relationship between pneumoconiosis and the mining environment. The origins and plans of the NCB's pneumoconiosis field research were described and some of the early results from field research were presented and their bearing on mining operations assessed.

Although final conclusions were not justified, said Dr. Rogan, it seemed likely that simple penumoconiosis had little, if any, effect on lung function. When it reached a moderately advanced stage, however, it did pre-dispose to progressive massive fibrosis. Moreover, it seemed likely that a high prevalence of pneumoconiosis would be associated with a high prevalence of respiratory symptoms which had a material effect on lung function. Dust suppression should therefore be steadily intensified. This was especially true of South Wales. It was still too early to discuss the attack and progression rates of pneumoconiosis in the pits in South Wales, but the prevalence of the disease encountered in pneumoconiosis field research and surveys was formidable and called for the most vigorous efforts of both men and management.

"Power Loading in South Wales"

The first part of the joint paper on "Power Loading in South Wales" was presented by Mr. Standerline, who dealt with the associated problems in power loading in South Wales and traced the development from the introduction of the first machines. Experiences were listed and an appraisal made of the present position and future trends, with particular reference to rapid ploughs and shearer loaders.

The effect of the most important of these power loaders on the size consist of the coal was examined by Dr. Evans in the second part of this paper. Because of their wider usage, the shearer loader and the plough were considered in greater detail. The performance of the plough varied with the seam characteristics and was particularly successful in anthracite seams which had closely spaced slips and cleavage planes.

The product from the shearer loader suffered more severe degradation, but the effect could be mitigated by the correct design of the drum surface. Investigations undertaken showed that pick density and lacing were very important in the production of the larger sizes, but the reduction of fine coal was achieved by installing paddles of the correct dimensions. Further decrease of the fines content could be achieved by maintaining the haulage speed over 9 ft./min. and by modification of plough design.

In examining future power-loading policy, Mr. Standerline said thought was paid to the possibility of using mechanized room-and-pillar methods, with either one of the forms of the continuous miner or gathering-arm loader.

With regard to longwall faces, the most important consideration was to plough where the conditions were suitable and to use shearer loaders where this was not possible, unless the overall requirements were better met by some other power-loader.

There would continue to be an important field for shearer loaders, possibly in many cases with Mawco or Dranyam attachments or with other special drums. An examination of the plough failures over a long period suggested that, apart from those where geological problems would have precluded the use of other forms of power loaders, they were mainly associated with thick seams and variations of physical conditions along different

parts of the face. On the whole, thick seams were more subject to uneven floors, intrusions, etc., and these variations had occasionally made ploughing very difficult.

It was planned to expand the field of operation of the trepanner, Slicer, and Midget Miner in order to define more clearly the field of application of each. Not only would new types be tried, but in due course special techniques would be developed to suit some of the conditions peculiar to certain parts of the South-Western Division.

To improve further the size consist, said Dr. Evans, attention must be paid to the plough design to reduce the possibility of coal being recirculated in the well between the plough and the drum. An open-ended plough had been suggested for this purpose in order to permit a clear passage for the coal at the bottom of the drum so that it trailed through the plough and on to the track. To achieve this the end plate of the plough adjacent to the drum must be removed and the ploughing ramp at the other end of the plough so hinged as to allow it to be raised during the shearing operation of the machine and dropped back for the ploughing run. A plough incorporating these principles had been developed by the Central Engineering Establishment and the limited tests so far undertaken were promising.

Annual Dinner

Proposing the toast to the Institution of Mining Engineers at the annual dinner, Mr. John C. George, Parliamentary Secretary to the Ministry of Power, referred to the tragedy at Arreal Griffin Colliery, Abertillery (Mon). He said the institution had always been concerned with the safer winning of coal. Although British mines were the safest in the world, there were those in the industry who realized the dangers of complacency. A new drive was required to make the mines even safer.

Turning to recent trends in the industry and the challenge offered by competitive fuels, Mr. George said success lay in an imaginative sales policy and the reduction of production costs. Although the competition now facing the industry could be expected to continue, by 1965 80 per cent. of the output would be obtained from new or reconstructed mines.

Replying to the toast, Mr. R. G. Baker, president of the institution, thanked Mr. George for his reference to the work done by the institution. The institution, he said, had the opportunity of bringing together mining engineers from all parts of the country, thus enabling them to solve some of the problems facing the industry.

Mr. Robert A. Moore, president elect of the institution, proposed the toast to the guests, to which Mr. W. F. Cartwright replied.

OPTOSHIELD, LIMITED, 146, Clerkenwell Road, London, E.C.1, has been appointed sole distributor in Great Britain for Ampco spark-resistant tools. Over 400 different tools in Ampco metal, beryllium-copper, or Monel metal, are included in the range.

A Rare Chemical is

Found in Processing US Anthracite

DISCOVERY that the rare chemical coronene can be produced during the conversion of certain American coals to pipeline gas has been made by investigators of the US Bureau of Mines, Department of the Interior. Coronene has previously been obtained only by complicated processes, chiefly by the hydrogenation of coal into liquid fuels, but it has never been detected before in American coals.

Chemists of the Bureau of Mines encountered the characteristic needle-like crystals of coronene while using a simpler hydrogenation technique for making pipeline gas from coal. The discovery occurred while tests were being run on powdered anthracite from Luzerne County, Pa.

Coronene was produced by the Germans during the last war as a by-product from complex plants built to make synthetic petrol and other liquid fuels from coal. Coronene so obtained was used as a base for dyes. Destruction of many of the German synthetic fuels plants during the war, the failure to rebuild them, and the abandonment of remaining plants following return to peacetime imports of petroleum, automatically ended the output of coronene in Germany.

Recovery of coronene from Pennsylvania anthracite by the chemists of the Bureau of Mines was at a rate of 1 lb. per 1,000 lb. of coal. Since coronene never has been used commercially in the US and because its market cost of $2 to $3 per lb. places it in an unfavourable competitive position with other dye bases, the bureau does not forecast a rosy future for coronene in the next few years. Should the production of pipeline gas from anthracite become commercially feasible, however, the simultaneous recovery of coronene could help under write the cost of gasification.

One of the significant features in connection with the recovery of coronene at Bruceton, the bureau reports, was that it was found only during the processing of anthracite. Bituminous coal or char did not yield the chemical.

British Ropes at New York Exhibition

Off the east coast of England where the most rigorous and varied sea conditions are experienced, the central research department of British Ropes, Limited, Doncaster, maintains a test boat station as a link between its laboratories and the company's marine products. Some of the researches carried out on this rope test boat were displayed on the stand of the associated company, B. R. International Inc., at the British Exhibition in New York. Actual samples were on view and visitors could see some of the methods by which the company is enabled to develop ropes to withstand the most difficult operational conditions. The various stages of corrosion fatigue in a wire were demonstrated in a series of micro-photographs.

THE MINERS' WARNING

"Bitter Resistance" to Decentralization of Coal

WARNING to the Government that any attempt to decentralize the mining industry would invoke "the most forceful resistance by mineworkers," was given by the National Union of Mineworkers at its conference at Llandudno on Tuesday. Moving an emergency resolution by the executive, Mr. Will Paynter, general secretary, said: "These are no pious words. I warn this Government that if they proceed to carry out these policies and proposals, there will develop in this industry such bitter opposition and resistance as can only be paralleled with the struggles of 1926."

Mr. Paynter said he was making a clear and definite statement that the Government had promoted proposals to decentralize control in the industry, including divisional boards operating as separate entities, with fundamental changes in the constitution of the National Coal Board, and he challenged the Minister of Power to give a specific reply to this statement.

Mr. Paynter said: "The idea is that the nationalized industries should be given a target of a fixed return on the capital employed by them. If that fixed return on the capital is not realized in any year, the Government would intervene and take more direct control in the running of the industry."

Effect of Divisional Trading

Other proposals, he believed, were that the nine Divisional Boards should be individually responsible for their own trading, and that members of the NCB should be replaced by divisional chairmen and high officials nominated by the Minister.

The Government was also planning new finance policies for the nationalized industries. "My general comment on this situation is that we are facing a double-barrelled assault on nationalization; through the medium of structural changes in control, and drastic restriction of financial policy," said Mr. Paynter.

He said he was surprised to learn that Mr. Alfred Robens, chairman-designate of the NCB, had stated in a television interview that he was not opposed to decentralization of the coal industry. "Mr. Robens would be well advised before he makes statements that involve the future destiny of this industry and the men who are employed in it, at least to have some consultation with persons who know the industry."

If divisional boards were given statutory authority to trade independently of each other, Mr. Paynter asserted, it would mean reviving price wars among the Areas, and giving prosperity to some coalfields at the expense of others. It could mean the development of disunity in the organization, and could be the first step in the break-up of national agreements and the restoration of district agreements.

In the hour-long debate on the resolution, which was passed unanimously, Mr. Abe Moffat, the Scottish miners' president, declared: "It is better to go out fighting than to die on our knees in this great basic industry." Decentralization and Government control of capital investments would mean the destruction of the industry in Scotland, Durham, Northumberland, Cumberland, Kent, and parts of South Wales.

Mr. Sam Watson, the Durham miners' leader, appealed to delegates not to be sidetracked by talking about the chairmanship of the NCB. Mr. Robens had spent his whole life in the working class movement, and was one of the ablest men they had, he said. If they preferred a retired general or admiral, or a member of the Tory Party, it would not do the union any good.

When the conference opened on Monday, Mr. Ted Jones, vice-president of the union, said the mining industry wanted a breathing space to continue its work free from the hostility, acrimony, bitterness and interference to which in recent years it had been subjected by its critics. Mr. Jones has been acting president since the retirement of Mr. W. Ernest Jones earlier this year.

Resistance to decentralization was also Mr. Jones' main theme. He vigorously attacked "evil and ill-informed criticism" of the coal industry. Most of it, he said, was deliberately distorted and indecently biased, and took no account of the fact that without nationalization most of the coal industry would have become decadent and left the nation in a precarious position.

"We have passed the point of no return and will strenuously resist all efforts to revert to former policies," he declared. The industry, he went on, needed both central control and local freedom. The union favoured neither a degree of centralization which meant lifeless bureaucratic control from London, nor a degree of decentralization which spelt anarchy and set each coalfield against all the others. It was a matter of degree.

The miners were less dominated by theory and were more practical and open-minded than their critics. They would have to revise some of their outmoded practices, however, and accept that the future of the industry lay in fewer and more efficient units.

Mr. Jones ended with yet another appeal to the Government for a co-ordinated fuel policy. To run down Britain's only natural fuel resources in favour of imported oil, which caused a great strain on the balance of payments and was strategically unreliable, was "economic lunacy" he said.

A resolution calling for a "substantial increase" for the industry's 350,000 day-wage workers was adopted on Wednesday, but only after Mr. Paynter had made it clear that the amount and timing of the claim would be at the discretion of the executive. A South Wales resolution, which sought to tie the executive down to making an immediate application for a 30s.-a-week increase—to include pieceworkers—was rejected on Mr. Paynter's advice.

He warned that before submitting a new claim there had to be a "very serious appraisal" of the circumstances and factors operating in the industry at the

present moment. A further deficit of £16,000,000 had been estimated for this year, he reminded delegates. Morever the union faced a situation in which it could not indicate any depreciation of earnings on the basis of the retail price index.

Mr. Sam Watson said the claims on the union's agenda would cost the industry £100,000,00 if granted. Where was the money to come from? It could only be found if either the price of coal was increased, or if there was a subsidy, or if the interest charges were removed. Looking at the situation realistically, he said, the only way in which the miners could improve their wages was by co-operating with the Coal Board to improve still further the efficiency of the industry.

Government sources stated on Wednesday that whatever "secret report" the miners may or may not have secured, it could not be a record of any decision by Ministers about the future of the coal industry, since none had been taken. The Government's position remained as stated by the Minister of Power, Mr. Richard Wood, that it had no plans to denationalize the industry or to return to district wage agreements.

Yesterday (Thursday) Mr. Paynter announced that the union would be putting resolutions opposing decentralization before both the TUC and Labour Party conferences this autumn.

Warning of Pit Deputy Shortage in North Staffs

SHORTAGE of underofficials in the North Staffordshire coalfield was causing concern, it was stated at the quarterly delegate meeting in Hanley, Stoke-on-Trent, of the local Area of the National Association of Colliery Overmen, Deputies, and Shotfirers. Mr. B. Lindop, secretary, said there was a great need for more deputies in the area. "We are 51 short, and unless we get some good lads coming forward we shall be in a sorry state in the future."

It was stressed at the meeting that while members were in charge of all underground work associated with both men and production, their prime job still was to see that coal was won in a safe manner. Referring to the great progress in mining since his early days as a pitworker, Mr. Gordon Dale, Lord Mayor of Stoke-on-Trent, told the association it was ridiculous for anybody to say that the mines were finished.

He felt, however, that the Coal Board should give a greater lead in encouraging the use of coal-burning apparatus wherever possible. As a railwayman he was surprised that more and more diesels were being brought into use at collieries where there were plenty of steam engines with years of valuable service available.

Ransomes & Rapier, Limited

IN our reference in last week's issue to changes in the board of Ransomes & Rapier, Limited, the company's activities were, inadvertently, wrongly described. Ransomes & Rapier is, of course, the member of the Newton, Chambers & Company, Limited, group responsible for a wide range of engineering plant, including giant walking draglines, excavators, mobile cranes, etc.

Mr. S. C. Tyrrell has relinquished his duties as joint managing director of Ransomes & Rapier in order to take up the position of director in charge of the oversea interests of the Newton Chambers group.

Electricity Uses More Coal

COAL consumption for the first 25 weeks of the year is running at much the same levels as last year. The electricity industry—by far the largest consumer—has used over 1,000,000 tons more coal so far this year, bringing its total consumption to 24,616,000 tons.

Total output of saleable mined coal for the first 25 weeks of the year, at 101,945,100 tons, is 7,166,300 tons down on last year. Despite this decrease undistributed stocks of coal continue to rise and another 315,000 tons in the week ended June 25 brought the total to 34,568,000 tons, compared with 28,202,000 tons in the corresponding week of 1959.

There were 599,900 wage-earners on colliery books on June 25, against 661,000 on June 27, 1959, the numbers engaged at the coal face being 228,700 and 257,200 respectively. Total absenteeism (all workers) in the week ended June 25 was 14.34 per cent. compared with 13.98 per cent. in the week ended June 27, 1959. Output at the face was 3.945 tons and overall 1.391 in the week ended June 25 compared with 3.708 and 1.328 tons in the week ended June 27.

The following table gives (in tons) the output of saleable mined coal by division in the week ended July 2, and the tonnage lost through all causes (holidays, disputes, and go-slows):—

Division.	Week ended July 2, 1960.		Week ended July 4, 1959.
	Total output.	Tonnage lost.	Total output.
Scottish	338,100	13,900	372,200
Northern (N & C) ..	216,400	39,100	192,300
Durham	458,300	3,200	478,100
North-Eastern	779,600	44,500	820,000
North-Western ..	168,300	98,300	197,000
East Midlands ..	826,300	75,600	888,700
West Midlands ..	280,800	—	322,500
South-Western ..	367,900	9,200	420,400
South-Eastern ..	32,000	—	34,900
Great Britain—			
Deep-mined coal..	3,467,700	283,800	3,726,100
Other deep-mined (including licensed mines) ..	41,600	—	54,200
Open-cast coal ..	154,700	—	219,800
TOTAL	3,664,000	283,800	4,000,100

"MIDGET MINER" SEEKS OUT THE COAL

PRACTICAL trials have begun at New Lount Colliery (Leics) with a new control device which uses gamma rays as a probe to determine the thickness, direction, and undulations of the coal strata. The "midget miner," as it is known, is fixed to the cutting machinery and registers on a dial any change in the coal seams, directing the knives away from rock and other unproductive areas.

A spokesman for the NCB said last week: "This system of mining could one day replace manpower, although this is hardly envisaged yet. If it ever happens it would be many years from now." The experiments, he explained, were in the very early stages and it would be some time before they knew whether the probe was fully successful, but he added that the early indications were very hopeful.

Law Cases

DEPUTY CRITICIZED

For Evidence in Injured Miner's Action

A MINER, Mr. Christopher Brace (42), whose back was broken in an accident at Dinnington Main Colliery (Yorks), in 1956, was awarded £17,666 damages against the National Coal Board at Sheffield Assizes. Giving judgment, Mr. Justice Streatfeild said he suspected that attempts to "cover up" had been made by a pit deputy after the accident occurred. "I did not fail to notice that in giving his evidence he was too ready, like Pooh-Bah defending himself against the Mikado, to say he wasn't there."

Mr. Brace, who gave his evidence from a wheel-chair, said that while working at the colliery the deputy called him to a 4 ft.-6 in. overhang of coal. There were no nogs (wooden pegs) set in the cut and the deputy suggested pulling the overhang down with a ringer (a long metal bar). The deputy told him to bore it and, while in a half-kneeling position, the overhanging coal fell on him, breaking his back.

The deputy, Mr. Christopher Smith, stated there was no overhang of coal and Mr. Brace had been hit by a portion of coal which slid from the vertical face. He admitted that his report on the shift did not mention the accident, but he denied trying to "cover up" anything.

In his judgment, Mr. Justice Streatfeild said: "This presents a very ugly situation. One side or the other must be lying. Two witnesses had said there was no overhanging coal and no nogs in the face. The colliery manager had seen nogs when he arrived two hours after the accident. "It very strongly suggests that there seems to have been an unholy feverish rush to put the house in order before the manager arrived."

Underofficial Fined After Detonator Accident

DETONATOR set by Thomas Thickbroom (55), a deputy, in workings at St. John's Colliery, Normanton (Yorks) had not gone off when it should, and was struck by the compressed air pick of his friend, Mr. Jack Jones (46), who died from the explosion, it was stated at Wakefield West Riding Court. Thickbroom, who pleaded guilty to inserting more than one detonator into a shothole at the colliery on May 27, contrary to the Coal Mine (Explosives Regulations, was fined £20 and ordered to pay £7 7s. costs.

Mr. Alastair Sharp, defending, said that Thickbroom had been dismissed summarily, as within the rights of the National Coal Board, after 40 years in the pits, 30 of them at St. John's, where for the last 10 years he had been a Grade 1 deputy.

Prosecuting for the NCB, Mr. L. Wild said Thickbroom had put two detonators in the same shothole in the floor in the Beeston No. 2 District of the pit and fired them. When Mr. Jones later came along with a compressed air pick cutting up the floor, he must have hit an unexploded shot which had not detonated and sustained injuries from which he died.

Mr. Sharp said that Thickbroom had decided to do the shotfiring himself. One detonator became damaged in a roof fall. It was his duty to return it to the store, but he decided to fire off the damaged detonator with an undamaged one and so get rid of it. But this did not happen.

The chairman of the Bench, Mr. D. H. Currer Briggs, said it was a serious breach of regulations with very disastrous consequences, but Thickbroom had suffered very severely, and the Bench had decided not to inflict imprisonment.

£2,250 DAMAGES FOR LOSS OF EYE

ACCIDENT in May, 1956, at the Renfrew works of Babcock & Wilcox, Limited, turbine and boiler makers, nuclear plant engineers, etc., in which an employee lost the sight of an eye, led to an action for £3,000 damages before Lord Guest in the Court of Session. The plaintiff, Mr. Robert Marshall, said that as he was ladling metal into the casting bed it shot up into his face. He claimed the company should have provided him with eye-shields.

The defendants, denying liability, contended that visors and eye-shields were unsuitable for the type of work Mr. Marshall was doing and submitted that he should have worn the goggles issued to him.

The plaintiff was awarded £2,250 damages.

AT THE ADJOURNED HEARING of a claim by Mr. Harold Dungworth (22), a colliery ripper, for damages from the National Coal Board, Judge Ernest Ould at Rotherham County Court awarded the plaintiff £250 and costs. Mr. Dungworth claimed £400 for injuries received in a roof fall at Kilnhurst Colliery in August, 1958.

IN A CLAIM made by a chargehand, against Partridge, Jones & John Paton, Limited, Newport (Mon), for damages for an injury he received at the firm's Pontymister works, Judge O. Temple-Morris reserved judgment at Newport County Court until July 12.

NATIONAL CONFERENCE to be held in Brighton from October 12 to 14 is being organized by the Institution of Production Engineers to focus attention on recent technological developments in methods of manipulating metals which do not involve cutting. A programme of 16 papers will be presented under the main headings of Extrusion Techniques, Precision Forging, Form and Spline Rolling, and Sheet Forming.

Orders Placed

AEI's £317,000 Contract for Crane Motors

CONTRACTS worth £317,000 have been obtained by the motor and control gear division of Associated Electrical Industries, Limited, for more than 200 DC motors which will be used for driving heavy duty cranes in steelworks.

Ranging in capacity from 15 to 200 tons, the cranes will be installed at the new Spencer Works, near Newport (Mon), of Richard Thomas & Baldwins, Limited, for handling material in a strip mill. The orders were received through the consultants, the International Construction Company, Limited.

UNIVERSITY OF LIVERPOOL has placed a contract for heating, ventilating, fume extraction, and oil-fired boiler plant, to the value of £156,000, for the new organic chemistry laboratories, with Richard Crittall & Company, Limited, London, W.1.

THE CUBAN GOVERNMENT has placed a contract for a number of pumping stations with Sigmund Pumps, Limited, Gateshead (Co. Durham). The order is worth $750,000 (£268,000). The company has also received an order for 50 pumping sets to a total value of £80,000 for Russia.

LIMESTONE GRIT, conforming to precise grinding specifications, for use in conjunction with the new sinter process of John Summers & Sons, Limited, Shotton (Ches), has been ordered from Adam Lythgoe, Limited, Culcheth, Warrington. The contract calls for 180,000 tons of grit to be delivered over the next three years.

ORDER FOR 27 presses worth about £1,500,000 has been placed by the Ford Motor Company, Limited, with Danly Machine Specialities, Incorporated, of Chicago and London. They will be built by Danly's sub-contractors, Harland & Wolff, Limited, at its Scotstoun works.

TRACTION DIVISION of Associated Electrical Industries, Limited, has received an order from the New Zealand Government for 20 sets of power equipment for diesel electric locomotives to be built in New Zealand Government workshops. The diesel engines are to be supplied by British United Traction, Limited, acting as sub-contractors to AEI.

SOVIET IMPORT AGENCY, Techmashimport, has signed a contract with Platt Bros. (Sales), Limited, Oldham (Lancs), for the delivery of textile machinery for the processing of synthetic yarns. All the machinery, which is worth £700,000, will be manufactured by the associate company, Dobson & Barlow, Limited, Bolton, and deliveries will begin next year.

FURTHER ORDER from Russia for 10 Model V.8 universal gear hobbing machines, valued at over £27,000, has been placed with Dowding & Doll, Limited, machine tool manufacturers, of London, W.14. It is the third order for hobbers that the company has received from Russia this year, bringing the total to 56 machines, worth over £136,000.

FURTHER ORDER, worth £3,250,000, for 5,900 tractors and implements has been placed with Massey-Ferguson, Limited, by Industrija Traktora I Masina—the Yugoslav importing and manufacturing organization. With the delivery at the end of December of the machines the total value of exports by the company to Yugoslavia over the past five years will exceed £18,000,000.

ORDER FOR 35 miles of 4-in. diameter concrete lined spun iron pipes with Tyton joints, together with a number of other fittings has recently been received by the Stanton Ironworks Company, Limited, near Nottingham, from its representative in Australia, Stewarts and Lloyds (Distributors) Pty., Limited. The pipes will be used in the water mains in the Sydney Metropolitan area.

BIRMINGHAM FIRM of industrial consultants, Production-Engineering, Limited, is to plan and co-ordinate every stage of production in a new £50,000,000 car plant to be built by Alfa-Romeo, SPA, near Milan. The contract—secured in the face of strong American and continental opposition—is the largest won by the company in Europe since it entered the Common Market last year with the formation of a continental branch, Production-Engineering, SA.

United Steel Companies Management Changes

SEVERAL changes and new appointments have been announced by the United Steel Companies, Limited. Lt.-Col. P. F. Benton Jones, the managing director (mining and carbonization) of United Steel, has relinquished the post of general manager of the United Coke & Chemicals Company branch and is succeeded by Mr. A. L. Curtis, the operations manager. Mr. T. B. Adkins, the general manager of the ore-mining branch of United Steel, for the past 13 years, has retired, after 56 years with the company. He is succeeded by Mr. D. R. Ward Jones who was previously assistant general manager.

Mr. Andrew Jollie has decided to resign as a director and general manager of the Steel, Peech & Tozer branch of United Steel at the end of the month. His place will be taken by Mr. T. S. Kilpatrick, who is at present a director and general manager of the Workington Iron & Steel Company branch of United Steel.

Another new appointment at Steel, Peech & Tozer, is that of Mr. R. Waller who has succeeded Mr. A. Stark as mechanical maintenance superintendent. Mr. Waller joined the drawing office of the company in 1933 and became new construction engineer in 1953. Since 1959 he has been assistant to Mr. Stark, who has retired after 22 years' service with the company.

Mr. T. Wintrup, sales manager (engineering) of another branch of United Steel, Distington Engineering Company, Limited, has been appointed its purchasing and contracts manager. He will be responsible to the commercial manager for purchasing and for the placing of all sub-contracts. He is succeeded by Mr. J. Tonks, senior draughtsman.

Capt. F. T. Boswell, who joined Samuel Fox & Company, Limited, also a branch of United Steel, earlier this year as assistant welfare officer, has now been appointed welfare officer. He succeeds Major W. G. A. Carrington, who has retired after 17 years' service.

DURING their summer meeting in Scotland last week, members of the Institution of Electrical Engineers, headed by the president, Sir Willis Jackson, FRS, director of research and education of the Metropolitan-Vickers Electrical Company, Limited, toured the works and laboratories of Bruce Peebles & Company, Limited, electrical engineers, of Edinburgh. They were accompanied by Mr. W. B. Laing, the managing director, and Mr. D. McDonald, the engineering director. On Friday last all the members of the institution at the meeting were the guests of the company at a buffet-cabaret-dance, held in Glasgow.

IRON AND STEEL TRADE

HIGH-PHOSPHORUS pig-iron and manufactured iron are the only sections of the trade to show any sign of weakness. The steel mills are universally busy, and find a sustained demand which with a few exceptions taxes capacity. So far the demand for motor-car steel is sustained, and the call for sheets from this market is in excess of the supply. The plate mills, similarly, cannot keep pace with demand. Order-books generally are filled for months ahead.

Pig-iron

Some sections of the foundry trade could undertake more business, notably those supplying light castings for the domestic utensil market. Builders' castings are in fair demand, and there is a continued call for high-duty castings which absorbs available supplies of suitable pig-iron. Hematite pig-iron is in adequate supply and refined irons are available as required. The busy steel trade calls for maximum tonnages of basic iron, demand for which is being met.

Ferro-alloys

The entry into the third quarter of the year has brought little general change in the demand, although it is expected that the holiday period will result in some reduction in demand during the next few weeks. Active conditions persist, with ferro-silicon a well-supported feature. Steady demand is experienced by ferro-chrome, while ferro-manganese, and calcium silicide also are quite active. Demand for ferro-titanium is at a good level. Ferro-niobium is in moderate request.

Ferro-tungsten is rather quiet at present, but there is a good demand for ferro-vanadium, and ferro-molybdenum is fairly active.

Finished Iron

Overall demand for manufactured iron is well below maximum production. Additional orders for home or export would be welcomed by makers.

Semi-finished Steel

Although most of the re-rollers are fully committed for their outputs of small bars and light sections for several months ahead and in many instances fresh business can only be accepted for 1961 delivery, the pressure from some establishments for supplies of steel semis has eased, as fairly good supplies of billets are held by them or are in course of transit to their works. Home steelworks continue to send forward substantial tonnages of prime billets, etc., but arisings of defectives and crops are not now disposed of so easily.

Finished Steel

Demand for steel sections and joists shows no immediate sign of slackening off, with the result that makers are having to extend their rolling promises. Consumers continue to place their orders for forward delivery, which is embarrassing the steelworks, as the number of sizes for which they are able to accept further orders is becoming smaller each week. The works are already overloaded with tonnage for current and forward rollings of certain sections.

Plate mills continue to operate at the highest possible level, but even so are unable to cope with the current demand, especially in regard to the lighter gauges. By the end of the current year, or early next year, when it is expected that new plant now in course of erection will come into operation, the position will, it is hoped, be eased considerably.

Demand for cold-reduced sheets is in excess of present home production, but substantial quantities of American sheets are arriving, which will alleviate the position to some extent. With the soft billet position eased, due to recent imports, re-rollers are in a better position to meet their overdue obligations. If they could obtain further skilled labour with which to operate additional shifts output could be increased substantially. Carbon and alloy billets are still in short supply.

Fairly prompt delivery of ordinary quality bright drawn steel can be obtained, but it is difficult to get early delivery of free-cutting, Ledloy, and alloy grades, due to the lack of raw materials. Cold-rolled strip is in strong request, but the call for black sheets and hot-rolled strip does not improve. Flat and corrugated galvanized sheets maintain their demand, but capacity is still available in current and forward programmes.

Structural engineers, while finding the position somewhat better than of late, have capacity available for further business. Additional orders for arches, benk bars, pit props, light rails, and other colliery accessories would be appreciated, as makers have capacity available for additional tonnage in both their current and forward programmes.

Labour Shortage Warning to Dropforging Industry

WARNING that the dropforging industry might in ten years' time be unable to find the labour required for its existence was made by Mr. T. P. Bowman, director of operations of Personnel Administration, Limited, at the annual conference of the National Association of Dropforgers and Stampers at Torquay last Friday.

Mr. Bowman, speaking on "Management—Today and Tomorrow," said that from the human point of view it was vital for dropforgers to improve their manufacturing process, and every effort should be made to this end by the association's newly-formed research organization. He also referred to the industry's need to modernize many of its factory buildings.

It was not enough for management to look a year or two ahead. It had to try to envisage conditions in five or 10 years' time, and this applied to all aspects of an organization's activities—the products it made, its manufacturing methods, marketing techniques, and personnel policies.

APPROVAL has been given to the plans of Robert Stephenson & Hawthorns, Limited, to extend its locomotive fabrication shops at Darlington.

Non-ferrous Metals

Tin Tops £800 a Ton

FROM July 1 the buffer stock manager came under the order that no tin could be sold below £830 a ton. In anticipation of this regulation coming into effect the price in London decisively broke through the £800-a-ton mark. Demand is good both here and on the Continent, while in New York the recent improvement has been maintained with the price now up to around $1.03 cents a pound. Stocks of tin in LME warehouses continue to rise slowly and at the end of last week totalled 8,748 tons. Nevertheless, the backwardation persists which clearly suggests that most of this metal is in the hands of the buffer stock manager.

Copper in London is still being sustained by the somewhat confused situation in the Belgian Congo. Stocks in LME warehouses increased last week by 82 tons to 3,440 tons. This came as something of a surprise to the market which had been looking for a fairly sharp drop owing to the recent Liverpool dock strike.

Lead remains a weak market in London and featureless in New York. Indeed, there is nothing in the outlook to suggest that the LME price will move very far either way from its present level of around £71 a ton. In the US the New York spot price remains unchanged at 12 cents a pound.

Zinc continues to be a relatively good market in London with supplies none too plentiful. However, the market is slightly irregular and the quotation is fluctuating narrowly around £90 a ton.

Official metal prices in London yesterday (Thursday) were:—Copper, Standard: Prompt £255, forward £244 10s. Tin, Standard: Prompt £809 10s., forward £801 10s. Lead: Prompt £71 10s., forward £72 7s. 6d. Zinc: Prompt £90 2s. 6d., forward £89 17s. 6d.

Construction Equipment Exhibition

FIRST Construction Equipment Exhibition, to be held on a site at Crystal Palace, London, from June 15 to 24 next year, will present the "most comprehensive display of equipment for the building and civil engineering industries assembled on one site in the UK." It is being promoted by Construction Equipment Exhibitions, Limited, a new company, and organized by Industrial and Trade Fairs, Limited.

Directors of Construction Equipment Exhibitions, Limited, include Mr. C. A. Hannah (chairman), managing director of Pegson, Limited, manufacturers of coal and quarry plant, etc., of Coalville (Leics), and a former president of the Federation of Manufacturers of Construction Equipment; Mr. J. Annette, director of the federation, and Mr. A. Yorke Saville, the federation's president, who is managing director of Construction Machinery, Limited, motor grader manufacturers, of Wakefield (Yorks).

PAN FEEDER manufactured at the Fraser & Chalmers Engineering Works of the General Electric Company, Limited, Erith (Kent), is claimed to be the longest ever built in the UK. It is 45 ft. long and is part of a contract placed by the Associated Portland Cement Manufacturers, Limited, for a limestone crushing plant in western Nigeria. It is designed to crush rock up to a maximum dimension of 36 in. at the rate of 200 tons per hour.

Split in ECSC Over Investment Control

A SPLIT in the High Authority of the European Coal and Steel Community has resulted in the resignation of its vice-president, M. Coppé, from his chairmanship of the working party on cartels and mergers. This followed a statement by the Authority in answer to a Parliamentary question, that official control of investments was regarded as not being in principle one of the conditions to be imposed for approval of a merger between coal or steel undertakings.

The episode is the outcome of M. Coppé's handling of the application for approval of the merger between the Thyssen interests and Phoenix Rheinrohr, which was finally withdrawn after the outstanding points had apparently been settled.

At a press conference recently, the head of the French steel syndicate, M. René Damien, urged a "total union" between the six member countries of the ECSC, as a result of which the ECSC itself would be fused with Euratom and the Common Market association.

The imperfection of the Coal and Steel Community, he said, had become obvious as a result of the coal crisis, and the joining of coal and steel in one body had proved unnatural. Coal received pressure from other sources of energy not bound by the same rules, while the steel industry suffered in individual countries as the result of unequal influences in the outside world.

In the steel industry a new form of association was needed, in which steel industrialists in the various countries should come to an agreement for close co-operation, which would be better than the competitive conditions of today and result in lower production costs, raising of quality, and better welfare for workers.

The Authority is to use $42,000,000 of its reserves—all but $4,000,000 of those accumulated at the end of its current financial year—to meet a heavy increase in expenditure in the next 12 months. Largest single item in estimated expenditure is $45,100,000 for re-adaptation aid. Total expenditure in its provisional budget for 1960-61 is expected to reach $75,100,000, which apart from re-adaptation aid includes $17,200,000 for technical research.

It is understood that plans for a single industrial association of the iron and metal industries of the six countries of the European Common Market and the seven of the European Free Trade Association have been disclosed by a spokesman of the Association of West German Iron and Metal Using Industries in Düsseldorf.

The planned organization, he is reported as saying, "could become one of the most important industrial groups in Europe, and a powerful instrument for bridging the gap between the two trading blocks." Proposals for its administration were to be worked out by October, he said.

INTERNATIONAL FIRM of compressed air engineers, Atlas Copco, AB, of Stockholm, has made an offer for the control of Svenska Diamantberg Borrnings, AB, a Swedish company which specializes in drilling operations for testing soil, rock strata, ore deposits, and mines. The offer is five Atlas Copco shares and Kr. 30 cash for one SDB share and the offer is being covered by the issue of 562,000 Atlas Copco shares at par value of Kr. 25 a share. The boards of both companies favour the proposition.

Company News

DAVY-ASHMORE PROFIT FORECAST

Mr. D. F. Campbell on Export Trade Prospects

FINANCIAL and technical resources to carry out major contracts on a scale and scope that has never been available from a single British manufacturing organization will be provided by the consummation of the proposed merger of Davy-United, Limited, and the Power-Gas Corporation, Limited, says Mr. D. F. Campbell, chairman of Davy-United. For this, valuable experience has been obtained by both the Davy and Power-Gas organizations in many contracts executed oversea.

Mr. Campbell continues: "Much of this export trade is complicated owing to the demands for extended credit and the position in South American countries, for example, is difficult. The European market is all at sixes and sevens and the countries of the Communist block remain an enigma, but they are all potential buyers of the products of Davy-Ashmore, Limited [the name to be adopted by the combined groups], and it will be the task of the directors to find the solutions to all these problems. However, apart from expansion in steel output in many lands oversea, the industry in the United Kingdom still requires much modern equipment owing to the rapid obsolescence of plant due to technical developments."

A joint statement relating to the proposed merger forecasts that the combined profits of both groups for the year to March 31, 1961, will be not less than £4,000,000 before tax. This would justify the payment by Davy-Ashmore of dividends totalling 25 per cent., as reported with the merger terms.

SYMONDS ENGINEERING COMPANY, LIMITED—Final dividend of 17½ per cent. makes 27½ per cent. for the year ended March 31, 1960. Net profit was £48,213 (£41,663), after tax of £46,394 (£41,663).

BIRMINGHAM SMALL ARMS COMPANY, LIMITED—The controlling interest (51 per cent. of the share capital) in Hobbs Transmission, Limited, has been sold to the minority holders. No terms are revealed.

DUBILIER CONDENSER COMPANY (1925), LIMITED—Dividend is being raised by 5 per cent. to 30 per cent. for the year to March 31, 1960, and it is proposed to capitalize £323,269 in a one-for-one scrip issue.

BIRFIELD, LIMITED—Sales during the nine months ended April 30, 1960 increased by over £4,000,000, compared with the corresponding period last year—from £14,768,000 to £18,845,000. Net trading surplus for the period nearly trebled from £617,000 to £1,801,000.

CRITTALL-HOPE METAL WINDOWS (SOUTH AFRICA), LIMITED—The company, which is jointly owned by Crittall Manufacturing Company, Limited, and Henry Hope & Sons, Limited, is halving its dividend to 5 per cent. for the year ended February 29, 1960. Net profit fell from £96,908 to £32,901.

CALEDON SHIPBUILDING & ENGINEERING COMPANY, LIMITED—In addition to maintaining the dividend at 10 per cent. for the year ended March 31, 1960, a bonus of 5 per cent. is to be paid. Favourable long-term contracts completed during the year combined with increased efficiency following modernization and re-equipment caused the net profit to rise to £240,487 (£144,450), after tax of £263,208 (£144,500). A repetition of such figures cannot be expected under the keenly competitive conditions now prevailing, state the directors.

THE BRITISH OXYGEN COMPANY, LIMITED—Having considered the advantages of bringing about a reduction in the value at which the ordinary stock is quoted on the Stock Exchange, the directors propose to turn the £1 stock into 5s. shares. An extra-ordinary meeting is to be held on July 27.

RENOLD CHAINS, LIMITED, precision chain engineers, of Wythenshawe, Manchester—Group net profits expanded from £495,561 to £926,809, after tax. The final dividend is 8 per cent., as forecast, on capital increased by a 50 per cent. scrip issue, making the equivalent of 10 (8.33) per cent. for the year.

RICKETT, COCKERELL & COMPANY, LIMITED, coal, coke, and fuel oil merchants, of London, E.C.3—A dividend of 2s. per 10s. share for the year to March 31, 1960, compares with a dividend of 1s. 6d. plus a jubilee bonus of 6d. A one-for-two scrip issue is proposed. Group profit, subject to tax of £168,514 (£171,210), is £343,954 (£331,901).

ACROW (ENGINEERS), LIMITED, structural engineers and builders' plant manufacturers, of London, W.2—Share capital of Thos. Storey (Engineers), Limited, has been acquired, and it is intended to redeem the £217,900 secured debenture stock of Storey at par and issue in place a similar amount of 6 per cent. unsecured loan stock, 1976-80, in Acrow.

TUBE INVESTMENTS, LIMITED—In response to the offer for the ordinary share capital of Raleigh Industries, Limited, valid acceptances have been received in respect of 3,866,688 (95.3 per cent.) of the shares. The offer was declared unconditional on June 1 and TI intends to apply the provisions of the 1948 Companies Act to acquire the remaining shares.

CHUBB & SONS LOCK & SAFE COMPANY, LIMITED, London, W.1—To facilitate expansion, it is proposed to increase the authorized capital to £1,300,000 by creating 300,000 new £1 preference shares. If holders of the existing 6 per cent. cumulative preference agree to the new preference ranking *pari passu*, the dividend on the whole issue is to be raised to 6½ per cent.

BURNETT & HALLAMSHIRE FUEL, LIMITED, Sheffield—All the capital of Allan & Harry Brown, Limited, dry-salters, of Nelson (Lancs), and of H. Camm & Company, Limited, civil and constructional engineers, has been acquired for £270,000 cash. It is proposed that the company now becomes purely a holding company, and its name changed to Burnett & Hallamshire Holdings, Limited. Its fuel business and trading activities are to

be transferred to a subsidiary, Burnett Brothers & Company, Limited, which will adopt the present name of the parent.

HALESOWEN STEEL COMPANY, LIMITED—As forecast, the company is maintaining its 1960 interim payment at 4 per cent. on capital increased by a one-for-five scrip issue. The 1959 final was 8 per cent. on the present capital. Profits to date exceed those for the same period of 1959, and unless the national situation alters, the directors expect that results for 1960 will be an improvement on the previous year.

DANIEL DONCASTER & SONS, LIMITED—In view of the heavy capital expenditure which may have to be met between now and March, 1962, and the substantial difference between the original and replacement cost of plant generally, the reserve for development and replacement of fixed assets is to be raised to £500,000 by the setting aside of a further £200,000, states the chairman, Mr. R. Steel.

STURTEVANT ENGINEERING COMPANY, LIMITED, mechanical and electrical engineers and contractors, of London, E.C.4—An Australian subsidiary has been established, Sturtevant Engineering Works Pty., Limited, which has acquired works at Villawood in the Sydney area. The new company provides manufacturing facilities for Sturtevant Engineering Company (Australasia), Limited, the group's selling organization in Australia. The company has also bought Mancuna Engineering, Limited, air conditioning engineers, etc., of Manchester.

WARD & GOLDSTONE, LIMITED, electrical cable manufacturers, etc., of Manchester—In his annual review, the chairman, Mr. Sampson Goldstone, criticizes the debasement of selling prices consequent upon "the incomprehensible practices of certain leading manufacturers who have either deliberately or by lack of knowledge, set a price standard below the costs of production." The injurious effects of "such arrant folly" he maintains, will remain for some time. He also expresses concern at the unrestricted importation of "Empire"-made electrical accessories produced in the Far East.

SIMMS MOTOR & ELECTRONICS CORPORATION, LIMITED—Negotiations have been completed for the acquisition of the whole of the issued share capital of Dawe Instruments, Limited, Ealing (Middx), and its associated manufacturing company, L.M.K. Manufacturing Company, Limited, Brentford (Middx), "for about £250,000." Mr. G. E. Liardet, the chairman of the group, states that for the year to date turnover continues to show a large increase over the same period last year and order-books are at record levels. A one-for-five rights issue is to be made of 1,737,224 5s. ordinary shares at 10s. a share. Net proceeds of the issue are estimated at £850,000.

Canal Water To Be Used for Colvilles' Gartcosh Mill

WATER from the Monkland Canal, an offshoot from the Forth and Clyde Canal, is to be drawn off and used for the cold reduction mill at Gartcosh—part of the strip mill project of Colvilles, Limited, at Ravenscraig, Motherwell. Sir Andrew McCance, chairman and managing director of Colvilles, said that it would require between 1,000,000 and 2,000,000 gallons a day.

Steel produced and rolled at Ravenscraig will be transported the five miles to Gartcosh to be finished at the cold reduction mill.

Newton, Chambers Appoints New Divisional Heads

TWO new appointments have been made in the excavator and engineering divisions of Newton, Chambers & Company, Limited, ironfounders, engineers, and chemical manufacturers, of Thorncliffe, near Sheffield. Mr. Walter Washbourne is to take up the post of deputy general manager of the excavator division at the end of the year, and will succeed Mr. R. J. Palmer when he retires as head of the division next year.

Mr. Washbourne, who served his engineering apprenticeship with the Coventry Gauge & Tool Company, Limited, was successively process planning engineer with Borg & Beck, Limited, production control superintendent with Simms Motor Units, Limited, and manager of the Trowbridge works of Newman, Hender & Company, Limited. In 1951 he became general works manager of the excavator division of Newton, Chambers, and now rejoins the company after a period as general works manager of the Wolverhampton Die Casting Company, Limited.

The heavy and light foundries in the company's engineering division are to be merged and Mr. John McPherson has been appointed as manager, with Mr. F. S. Cox as his deputy. Mr. McPherson was with Vickers-Armstrongs, Limited, for 16 years, becoming foundry foreman and he joined Hepworth & Grandage, Limited, Bradford, as foundry manager in 1948. He is an associate member and a council member of the Institute of British Foundrymen.

Why Accidents at Steelworks Are Increasing

"ALMOST every month there are two or three instances of foot injuries which could have been prevented by the wearing of safety footwear" states an article in the Phoenix Gazette, the works magazine of Steel, Peech & Tozer branch of the United Steel Companies, Limited. Pointing out that industrial accidents are on the increase at the works—in the first five months of 1960 there were 151, nearly double the figures for the same period last year—the article attributes the increase to three causes. People do not take proper care; near-accidents are not reported so that causes can be investigated and the potential danger removed, and insufficient use of protective equipment. In many cases accidents are due to the unthinking act of some individual, most often the victim himself. Men who fail to obtain prompt treatment at the works' medical centre for injuries resulting in septic infection are also criticized.

In October the firm's suggestion committee and safety department are combining to organize a competition in which the emphasis will be on accident prevention.

FOLLOWING reorganization of the company's Birmingham area representation, Evershed & Vignoles, Limited, electrical instrument manufacturers, of London, W.4, will now be directly represented by a new branch office at 58, Oxford Street, Birmingham 5, which will cover Derbyshire, Leicestershire, Shropshire, Nottinghamshire, Staffordshire, Warwickshire and Worcestershire. Management of the office will be under Mr. E. R. O'Dell.

THE COAL TRADE

ALTHOUGH some disappointment is felt at the poor results so far of the national advertising campaign to stimulate trade while summer prices prevail, merchants generally are confident that it is bound to have a beneficial effect in the long run. The call for almost all varieties of household coals and cokes is far from encouraging, but the industrial demand not only holds its own but in a number of places is showing an upward trend.

NOTTINGHAMSHIRE

The house coal market shows some improvement, and a steady flow of orders is reported. Merchants are far from busy, but consumer interest is more apparent. All qualities have been readily available, and this is expected to continue with the new programming. Stocking at depots is progressing well. Gas coke business is fairly good both for domestic use and for stocking, but hard coke seems slower, apart from current requirements.

Anthracite and "Phurnacite" are in good demand, but anthracite supplies are not sufficient. The smokeless fuels continue to enjoy increased interest, and supplies of all are adequate. Open-cast tonnage is difficult, but occasional extra supplies are available.

SOUTH WEST LANCASHIRE

There is no improvement in the demand for house coals which has now reached the same low level as last summer. The new allocation period for house coals has now started but very little stocking has yet been undertaken.

Demand in the gas coke market for domestic and central heating purposes is very slight although the industrial demand position is a little brighter. Stocks at gasworks are steadily accumulating. The general industrial demand is satisfactorily maintained and a good delivery service is being given.

In the coastwise section of coal shipments from the Merseyside docks there is still a very poor demand. The cargoes of house coals being shipped are mainly for Northern Ireland and the Isle of Man.

Average prices (per ton) for house coals are as follow:—Group 1, 182s. 8d.; Group 2, 163s. 3d.; Group 3, 146s. 5d.; Group 4, 134s. 8d.; Group 5, 121s. 7d.; Group 6, 111s. 5d.; Group 7, 97s.

More Iron Ore through South Wales Ports

TRAFFIC passing through the South Wales ports during the four weeks ended June 19 amounted to 1,503,494 tons, an increase of about 179,000 tons over the total for the same period last year. Imports of iron ore rose by 151,000 tons and iron and steel goods by 39,000 tons.

Coal, coke and patent fuel leaving the ports dropped by 14,000 tons, and tinplate exports also fell by 4,000 tons.

Total traffic through the seven ports so far this year (with comparable 1959 figures in parentheses) is as follows:—Newport, 1,087,645 (1,036,160) tons; Cardiff, 1,039,402 (988,616) tons; Barry, 595,268 (639,775) tons; Port Talbot, 1,654,924 (1,202,703) tons; Swansea, 3,723,149 (3,478,864) tons; Penarth, 188,661 (220,828) tons; Lydney, 13,932 (12,831) tons.

New Power Stations for Coal-burning Only

NEW coal-burning power stations being built at Leeds and Doncaster were not being designed to make it possible to convert them to oil burning, it was stated at the meeting of the Yorkshire Electricity Consultative Council at Rotherham on Monday. Mr. W. J. Moorhouse had asked if it might be possible to design the new stations so that they might be switched over to oil if it became competitive.

He also suggested that when the electricity authorities were considering the siting of new stations industry should be consulted. Many industrial concerns were now using large quantities of steam, and if it were possible to site a new station near a big steam consuming plant there could be a considerable saving by the use of waste heat.

Mr. W. H. Foster, of the Yorkshire division of the Central Electricity Generating Board, said it would not be possible to change over the new stations from coal to oil burning. The NCB had told the electricity authorities it could supply the new stations with all the coal needed, so there was no question of spending extra capital to make them interchangeable.

He added that the question of making use of waste heat from generating stations was always kept in mind by the board.

Coal Chartering

ALTHOUGH practically nothing appears to have been fixed from the UK, there is some enquiry from Wales to full range west Italy for August loading for which about 22s. is indicated and tonnage could also be placed to the Adriatic for prompt loading at about 25s. In the coasting section there is quite a reasonable demand for French destinations and East Coast UK quotes freely to Scandinavia.

Most of the business arranged from the Hampton Roads area has been for Japanese account. Two July/August vessels have been fixed at $8.35 and $8.50, and charterers are interested in the forward positions. Two relet cargoes, both 15,000 tons, for second half August and late September/October have been arranged from the Roads to Antwerp-Rotterdam-Amsterdam, both at 26s. A 12,000-tonner for second half July has also been reported for the same destinations but at 27s. 6d.

ROBERT LEGG, LIMITED, tobacco, cigarette, and tea machinery makers, of London, N.1—The company has been acquired by the American Machine & Foundry Company International Group.

Board Changes

New Director of M. & C. Switchgear

MR. R. W. WAIT

APPOINTMENT is announced of Mr. Robert W. Wait as director and general manager of M. & C. SWITCHGEAR, LIMITED, electrical engineers and manufacturers, of Glasgow, and an associate company of Mavor & Coulson, Limited, Glasgow, engineers and makers of conveyors, coalcutters, and handling equipment.

Mr. Wait served his apprenticeship at the Sheffield works of Mavor & Coulson. While graduating through the various departments of the company, he held successive appointments as electrical service engineer, technical representative, and chief electrical engineer and designer. He is a member of the Association of Mining Electrical and Mechanical Engineers, and was president of the West of Scotland branch of the association for 1959-60.

BELL BROS. (MANCHESTER, 1927), LIMITED—Mr. H. W. Bailey has joined the board.

TAP & DIE CORPORATION, LIMITED—Mr. N. H. Lane has been appointed to the board as an additional director.

BRITISH NORTHROP SALES, LIMITED—Mr. J. N. B. Cardwell, Mr. P. Franklin, and Mr. F. C. Sheldon have joined the board.

ALUMINIUM CORPORATION, LIMITED—Mr. G. J. S. Boex has retired from the board. Mr. J. Ritchie, Mr. J. Salter, and Mr. P. R. McGhee have been made directors.

J. & E. HALL, LIMITED, Mr. John Frederick E. d'Anyers Willis has been appointed chairman with effect from October 1, when Lord Dudley Gordon's retirement becomes effective.

BELFAST ROPEWORK COMPANY, LIMITED—Mr. R. P. C. Gotto has retired as chairman on medical advice. He is succeeded by Sir Harry Mulholland. Mr. E. S. Lamont has been co-opted a director.

FERODO, LIMITED—Mr. N. A. MORLING, a director of Turner & Newall, Limited, and chairman of its subsidiaries, has joined the board. The chairman, Mr. G. S. Sutcliffe, has joined the boards of the Turner & Newall subsidiaries.

THYSSEN SHAFT SINKING COMPANY, LIMITED—Mr. R. J. Carr has been appointed to the board. He will be responsible for all civil engineering contracts and his headquarters will be at Wesleigh House, 42, Coombe Road, New Malden (Surrey).

ALEXANDER SHANKS & SON, LIMITED—The Earl of Inchcape has resigned from the board and from that of Shanks Ironfounders, Limited, because of heavy business commitments. He remains a director of both companies. His brother, Mr. Alan MacKay, succeeds him as chairman.

F. PERKINS, LIMITED—Dr. Manuel G. Filho has been appointed managing director of Motores Perkins, SA, the Brazilian associate company, in succession to Mr. F. J. W. Holt who remains on the board but has become resident representative for the group in South America. Mr. Charles F. Hill has been made deputy managing director of Motores Perkins.

SMITH & WELLSTOOD, LIMITED—Mr. R. R. Fyfe Smith has been appointed vice-chairman and resident joint managing director of Smith & Wellstood (Pty.), Limited, Springs, Transvaal, and has consequently relinquished the joint managing directorship of the parent company. He remains a director and Mr. R. F. Maxwell becomes sole managing director.

K. G. (HOLDINGS), LIMITED—Following the acquisition of Modern Engineering Developments, Limited, Maj.-Gen. W. A. Lord, Mr. D. D. Mathieson, and Mr. R. S. Uffindell, directors of Modern Engineering, have joined the board and Mr. P. Edge-Partington has been made an alternate director of the company. Mr. S. Schaffer has resigned from the board and Mr. A. E. Stott has been appointed secretary.

HALL-THERMOTANK, LIMITED—Mr. J. F. E. d'A Willis, deputy chairman, has been appointed to the executive office of chairman of the company on the resignation for domestic reasons of Mr. I. M. Stewart. Mr. Stewart remains a director and chairman of Thermotank, Limited. Mr. J. C. Akester has resigned from the board, but remains a director of Vent-Axia, Limited, and of Axia Fans, Limited.

S. G. BROWN, LIMITED—Following the recent acquisition of the company by de Havilland Holdings, Limited, in association with the American Bosch Arma Corporation, the board has been reconstituted. Sir Aubrey Burke, chairman and managing director of de Havilland Holdings becomes chairman. Mr. F. W. Gale is to continue as managing director of the company, representing de Havilland. Mr. A. S. Kennedy, a director of de Havilland Holdings, and Mr. H. G. Sturgeon, managing director of de Havilland Propellers, Limited, have joined the board. Representing American Bosch Arma are Mr. D. F. Devine, Mr. C. T. Foss, and Mr. C. W. Perelle.

New Board for Arusha Industries

FOLLOWING a meeting between representatives of the board of Arusha Industries, Limited, and a shareholders' committee, Mr. L. S. Carstairs, chairman, has agreed—at the request of all the parties—to become president of the company. The new chairman will be Sir Harold Gillett and the board has been reconstituted and now comprises, besides Sir Harold, Mr. C. W. Kieft, managing director (at present managing director of Barrow Haematite Steel Company, Limited, and its subsidiaries), Sir Leslie Nicholls, Sir Leslie Hamlyn Williams, Mr. W. J. Darby, Sir Walter Pollen (formerly chairman of Sheffield Steel Products, Limited, and its subsidiaries) and Mr. W. McCall Dodds.

Mr. Kieft, Sir Walter Pollen, and Mr. Dodds are new directors and to make way for them Mr. B. Homfray-Davies and Mr. D. A. Young have resigned. Mr. D. J. Mant has also resigned from the board, but will continue as secretary. Mr. Homfray-Davies will continue as managing director of Aero Maintenance Equipment, Limited, and Mr. Young will continue as surveyor to the group. It is the new board's intention to co-opt Mr. R. E. G. Windsor at the earliest opportunity.

NEWS IN BRIEF

JAPANESE EXPORTS of steel and steel products last year totalled a record of $290,000,000. This is $25,000,000 more than in the previous record year of 1955.

RECENT VISITORS to the Engineering Centre, Birmingham, have included a party of 35 Russian engineers and members of the United Arab Republic Trade Mission to the UK.

ISRAEL STEEL MILLS, which last year produced some 20,000 tons of rolled goods, plans to increase annual output to 45,000 tons in the current year and to 100,000 tons by 1963.

INQUIRY BY THE Ministry of Housing and Local Government into a proposal to open up 5,000 acres of farmland near Banbury (Oxon), for ironstone mining is to be held on November 8.

PROPOSED MERGER between Natal Anthracite Colliery, Limited, and Natal Ammonium Collieries, Limited, has been abandoned since the two boards cannot agree fully on the terms.

ENGINEERS' MERCHANTS, of London, S.E.15, Thomas P. Headland, Limited, has been appointed official stockists of the "Red Head" anchoring system made by Phillips Drill Company, Limited, London, E.C.2.

UNDER a Kr. 30,000,000 investment plan by the Swedish concern Uddeholms A/B, the firm's steelworks at Hagfors is to be expanded and fitted with a 45,000 metric tons capacity arc furnace.

LICENCE TO manufacture Hamworthy-type air compressors 2TM6 and 2TH6 has been granted by Hamworthy Engineering, Limited, Poole, to the Society des Chantiers et Ateliers de Provence, Marseilles.

SERVICE SCHEME covering its full range of lifting magnets has been inaugurated by Rapid Magnetic Machines, Limited, Birmingham. The scheme provides for regular service check-ups by qualified engineers.

WEST GERMAN crude steel production totalled 16,700,000 tons in first six months of this year. The output for June was 2,600,000 tons, or 101,000 tons per working day—a slight reduction on the May figures.

VALUED AT ABOUT £38,000, all the instruments shown on the stand of Hilger & Watts, Limited, London, N.W.1, at the Moscow Exhibition of British scientific and industrial instruments are to be bought by the Russian concern Mashpriborintorg.

AMONG THE 10 BEST-DRESSED MEN in Britain, named on Monday by the Wholesale Clothing Manufacturers' Federation, were Mr. William McFadzean, president of the Federation of British Industries, and Sir Miles Thomas, president of Monsanto Chemicals, Limited.

AFTER RECONDITIONING, which included fitting a larger turbo-blower and auxiliary machinery, the No. 1 blast-furnace at the West Hartlepool north works of the South Durham Steel & Iron Company, Limited, has been relit. The furnace produces 5,500 tons of pig-iron a week.

AT THE INVITATION of the Government of Western Australia, William Denny & Bros., Limited, Dumbarton, is to send one of its directors to survey shipbuilding and shiprepairing facilities in the State and to discuss with Government representatives possible means of providing increased capacity.

REMAINDER of the site at Cwmbran (Mon), which Guest, Keen & Nettlefolds (Midlands), Limited, recently vacated through the lack of orders for rolling stock fittings, has been taken over by another member of the GKN group—Garringtons, Limited. Plant is to be installed and the company will manufacture precision forged components for the aircraft and motor industries. The rest of the site is occupied by GKN (Cwmbran), Limited, which has installed a large malleable iron foundry and is producing parts for the motor industry.

AGREEMENT HAS BEEN REACHED between Wellman Smith Owen (Furnaces), Limited, and Leone Tagliaferri, AG, Milan, whereby the British company is now able to offer exclusively in the United Kingdom, electric arc melting furnaces and ferro-alloy furnaces of the well-known Tagliaferri design.

A PROPOSED iron and steel plant would provide the nucleus of ancillary industry, such as aluminium smelting, oil refining, shipbreaking, shipbuilding, and cement works in the Singapore Government's £5,931,200 scheme for developing industrial estates on the island over the next five years.

MORE THAN 70 senior executives of the Brightside Foundry & Engineering Company, Limited, group met at Scarborough last weekend for the first sales conference ever called for the whole group. Mr. Tom Firth who, last month, succeeded his cousin, Mr. Ambrose Firth, as chairman of the group, presided.

THE CHAIRMAN of the miners' union in west Germany, Herr Gutermuth, has threatened massive strike action if new wage demands are not met and has sharply criticized both the Federal Government and the European Coal and Steel Community for failing to work out a clear-cut policy for co-ordinating all sources of power and energy.

INQUIRIES BY THE High Authority of the European Coal and Steel Community have revealed that a total of 168,000 metric tons of scrap were concerned in false claims from the ECSC scrap compensation fund involving every member country of the community, said vice-president Mr. D. Spierenburg. Investigations would be completed by the autumn.

NEW FACTORY in Caernarvonshire, North Wales, is to be built by Ferodo, Limited, brake and clutch lining makers, of Chapel-en-le-Frith, (Derbyshire), a member of the Turner & Newall, Limited, group of companies. The firm's South London branch has now moved to new premises at 114/116, Thornton Road, Thornton Heath, Surrey (Tel.: THOrnton Heath 2224).

FIRST 180 mVA. 275/132 kV. auto-transformer for the Central Electricity Generating Board's supergrid substation at Canterbury, left the works of Fuller Electric, Limited, last week. This is the largest auto-transformer built by this member of the Hawker Siddeley Group, Limited, and is the first of two units to be built at the works. The second unit will follow within a short time.

IN VIEW OF increasing demand and the importance of the area, Crofts (Engineers), Limited, power transmission engineers, of Bradford (Yorks), has decided to provide on-the-spot stocks and delivery service from new premises at 253-255, Great Lister Street, Birmingham. Mr. A. L. Duckering, Birmingham area sales manager, is in charge of the new building which opened on Monday.

FACTORY of Tubewrights, Limited, a subsidiary of Stewarts and Lloyds, Limited, at Newport (Mon), is to close down with the resultant dismissal of 400 workers. The company is to centralize its activities at its Liverpool works. Some of the 400 will transfer to the adjoining Stewarts and Lloyds' factory at Newport and other may obtain work at the new Spencer steelworks of Richard Thomas & Baldwins, Limited, Llanwern.

In Parliament

Minister Repeats His Pledge to Coal Industry

WHEN MR. ROY MASON (Lab.) pressed for an assurance that the Government did not intend to decentralize the coal industry, the MINISTER OF POWER, Mr. Richard Wood, repeated his pledge given last week that there were no plans to denationalize the industry or to return to district wage agreements. He again insisted that he must be allowed time for discussions with Mr. Alfred Robens, chairman-designate of the National Coal Board, before making any statement on future plans.

Asked by MR. EMANUEL SHINWELL (Lab.) about recruitment into the industry, the MINISTER said that 17,400 men were recruited during the first 24 weeks of this year. He had every hope that the Coal Board's long-term manpower requirements would be met.

Mr. Wood agreed that the present shortage was a "most serious factor," but he reminded Mr. Shinwell that many of those who had left the industry had been men over 65. That, therefore, would not recur. The board had always intended that the rundown in manpower should not be spread evenly over the years 1960 to 1965, but that a large part of it should take place in the first year or so.

COAL STOCKS REDUCTION

PROGRESS in achieving a 1,000,000-ton reduction in coal stocks this year was reported by MR. RICHARD WOOD, Minister of Power. He told Mr. Gerald Nabarro (Con.) that undistributed stocks on June 18 were just over 34,000,000 tons of coal and about 5,000,000 tons of coke, valued at about £135,000,000. The corresponding figure at the beginning of the year was slightly more than £140,000,000.

MR. NABARRO commented that stocks were 7,000,000 tons higher than on the same date last year and the Minister should give much more urgent attention to this "drug on the market." Stocks were below the level at which they began the winter, MR. WOOD replied. Instead of having an increase of 16,000,000 tons, as they had last year, it looked as though his estimate of a reduction of about 1,000,000 tons was not going to be far out.

OLD WORKINGS' DANGER

THERE was no reason to suspect that old workings were responsible for the mine explosion at Six Bells Colliery (Mon) last week, in which 45 men died, said MR. RICHARD WOOD, Minister of Power, answering questions by MR. EMANUEL SHINWELL (Lab.) Before any underground pit workings were abandoned there was a final survey, he said. Plans of these must be preserved and shown in the plans of any other mine in the vicinity.

MR. SHINWELL said the accident surely indicated that the barriers between one colliery and another had not been adequately surveyed. The matter was first considered 38 years ago when he was Secretary of Mines, and had been considered several times since.

Mr. Wood undertook to draw the attention of the Chief Inspector to the point.

SHEET STEEL IMPORTS

IMPORTS of sheet steel totalled 51,000 tons in April and 64,000 tons in May, compared with 23,000 tons and 19,000 tons in the same months last year, said Mr. J. C. GEORGE, Parliamentary Secretary to the Ministry of Power.

Replying to Mr. FREDERICK LEE (Lab.) he said that imports would be essential for at least two and perhaps three years, but they were not likely to reach significant tonnages. It was estimated that this year about 450,000 tons of sheet steel would be imported, and about 350,000 tons exported.

OUTPUT PER MANSHIFT in the coal industry was 28.2 cwt. in May this year compared with 26.6 cwt. in May, 1959, and 26.0 cwt. in May, 1958, said Mr. J. C. George, Parliamentary Secretary to the Minister of Power, in a written reply to Mr. Harold Boyden (Lab.).

SEVERAL HUNDRED new jobs were in prospect in the Barrow-in-Furness district, and no great difficulty was expected in placing workers who became redundant at the Barrow Steel Works, Limited, the President of the Board of Trade said in reply to Mr. Walter Monslow (Lab.).

STATING THAT the committee reporting on the machine tool industry had started to prepare its report to the Machine Tool Advisory Council, the President of the Board of Trade told Mr. Harold Davies (Lab.) that the pattern of any help to the industry must wait until it was seen whether such help was needed.

ASKED BY Mr. Norman Pentland (Lab.) about Government plans to meet contraction in the colliery areas of Co. Durham, the President of the Board of Trade said it was intended to steer industry to the area, and quite a substantial amount of new employment was likely to accrue there in the next few years.

Clydesdale Colliery Disaster: Report of Inquiry

INQUIRY commission into the Coalbrook mining disaster, Orange Free State, issued its report last Friday. It states that the 437 miners were entombed as a result of "negligence and wrongful acts and omissions" by certain mine officials. The men were working in a section of Clydesdale North Colliery when the ground collapsed over a wide area causing subsidence in the fields above and cracking roadways. Nobody was rescued and the area in which the men were entombed was sealed off without any bodies being recovered.

The names and descriptions given are those of the present consulting engineer, two general managers, two managers, two assistant managers, and "other managers employed at this colliery from 1950 to January 21, 1960 (the date of the accident), personally and through their servants and agents."

The magistrate who presided over the 35-day inquiry, Mr. P. J. Van Heerden, said, after reading his report, that the decision was not final. There was provision for the papers to go to the Attorney-General who might lay them before a judge of the Supreme Court.

In a report issued on Wednesday, the South African & General Investment & Trust Company, Limited—the holding company of Clydesdale Collieries—states that the evidence at the inquiry "did not justify the finding of negligence on the part of the mine management." The finding is, the company declares, "an expression of opinion, and does not constitute a judgment." Should proceedings be instituted, it would resist them and furnish every possible assistance and protection to the officials concerned.

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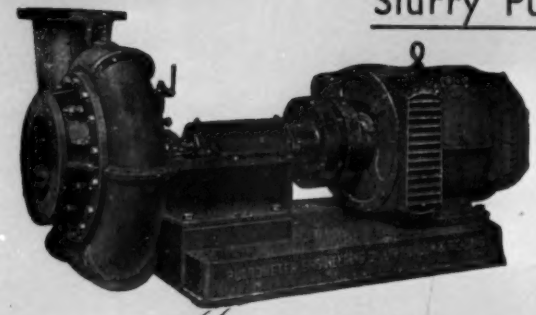

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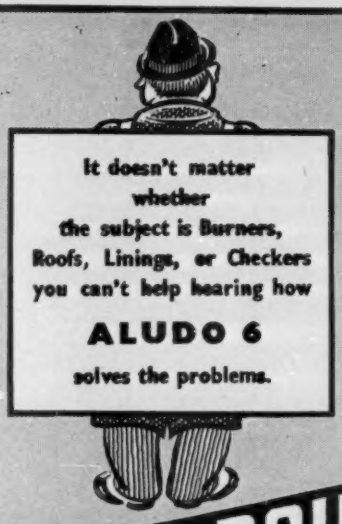

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Coalfield News

Compressed Air Saves Miners

COMPRESSED air for pneumatic equipment helped to save three miners who were trapped for nearly four hours behind a roof fall at Wath Main Colliery (Yorks) last Friday. Rescuers worked feverishly to release the men who were also making desperate attempts to free themselves as oxygen in the confined space began to dwindle.

Then a rescuer called out that the compressed air supply used to operate pneumatic picks would be turned on. The trapped men were able to breathe this through the coverings of the picks.

Mr. ARCHIBALD BROWNLEE, foreman mechanical engineer at the NCB workshops, Shotts (Lanarkshire), has retired after 50 years' service.

DURING JUNE, 51,545 tons of coal and coke were shipped from Garston Docks, Liverpool. Of this figure 50,321 tons were accounted for by coal shipments.

ROTHERHAM BOROUGH COUNCIL is to consider a recommended by its Health Committee that it should not create additional smokeless zones until the problem of miners burning concessionary coal in smoke control areas has been settled.

NEGOTIATIONS are in progress between the National Coal Board and Abercarn (Mon) Urban Council over the removal of the South Celynen coal tip. The 23 acres covered by the tip would be developed either by the board or the council when it is cleared.

A PRESENTATION WAS MADE by the local branch of the National Association of Colliery Overmen, Deputies, and Shotfirers to Mr. J. T. Ryall, who has relinquished the position of manager of Ferrymoor Colliery, Brierley (Yorks), to join a private mining machinery manufacturing concern.

OVERALL PRODUCTIVITY in the Durham Divisional Coal Board during the first 25 weeks of the year reached 21.99 cwt. per manshift, compared with 21.60 cwt. in the corresponding period of 1959. Productivity at the face averaged 64.70 cwt. per manshift, against 62.94 cwt. a year ago.

VERDICT OF ACCIDENTAL DEATH was recorded on Mr. Richard John Williams (52), a packer, who was killed at Oakdale Colliery (Mon) when an 8-ton boulder crushed him. The coroner said that it was just bad luck that Mr. Williams was in the recess when the stone fell.

PLANNING PERMISSION has been granted to Cadley Hill Colliery (Derbyshire) for the construction of pithead baths, a new canteen, and other surface improvements. The colliery is an important unit in the development of the western extension of the south Derbyshire coalfield.

Mr. RONALD W. PARKER, chairman of the Scottish Divisional Coal Board, visited Allanton, Shotts (Lanarkshire), on Monday to present awards for tidiness at pits in the Central East Area to Polkemmet Colliery, Whitburn (underground), Whitrigg Colliery, East Whitburn (surface), and Baads Colliery, West Calder (surface).

NO REDUNDANCY is promised by the West Midland Divisional Coal Board at Brereton Colliery (Staffs) which closed last Friday. Of the 250 employees, 130 moved to Lea Hall Colliery, two miles away, on Monday. Some of those remaining will be employed on salvage work, and others will be given jobs elsewhere on the Cannock Chase coalfield. The colliery's pithead baths may be bought by the local authority for conversion into public baths.

RETURNING A VERDICT of Accidental Death on Mr. Samuel Thomas (58), a miner who was killed at Penallta Colliery, Ystrad Mynach, recently, the jury recommended that the practice of fixing red warning lights on to trams underground should be used more extensively. Mr. Thomas died after being run over by the first three of a journey of 28 trams.

SHIPMENTS OF COAL AND COKE from the South Wales ports last week totalled 47,167 tons—a drop of 6,466 tons on the previous week and 4,098 tons below the level of a year ago. Exports from the various ports, in tons (with 1959 tonnages in parentheses), are as follow:—Newport, 1,467 (1,820); Cardiff, 10,864 (7,056); Penarth, 1,712 (3,060); Barry, 10,593 (6,192); Port Talbot, 43 (779); Swansea, 22,488 (32,358).

European Coal Output

THE appended figures relating to coal output and imports are taken from statistics issued from Geneva by the Coal Committee of the Economic Commission for Europe.

Tonnages are metric, and the number of underground workers employed relates approximately to the end of the month.

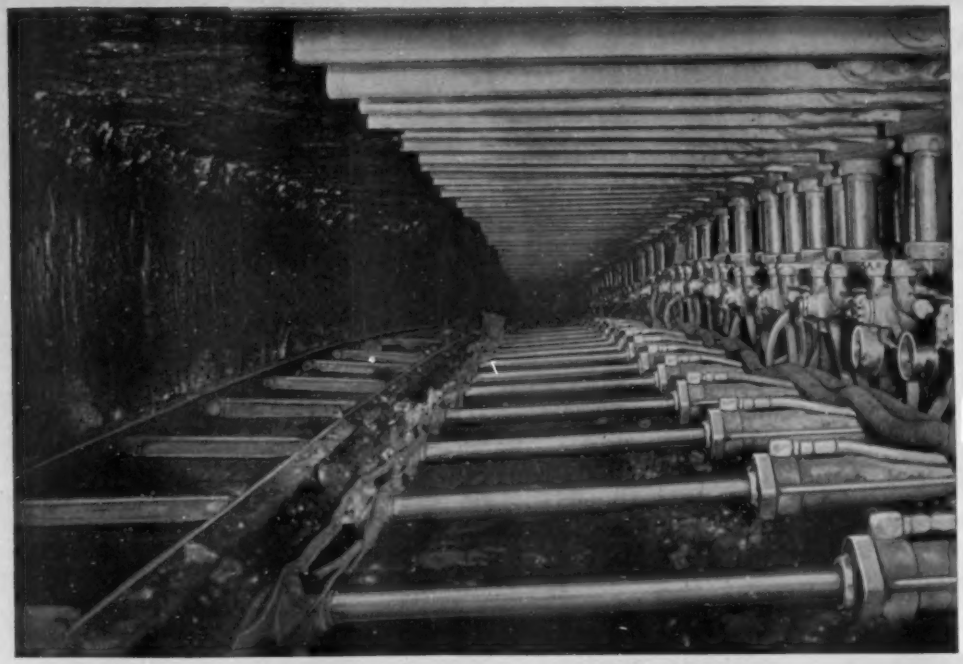
TABLE 1.—*European Coal Output (Metric Tons) and Employment.*

Country.	Output.		Underground employment.	
	April, 1960.	March, 1960.	April, 1960.	March, 1960.
Belgium	1,914,000	2,041,000	87,000	88,000
France	4,663,000	5,049,000	133,000	134,000
Italy	65,000	67,000	—	—
Netherlands ..	1,006,000	1,059,000	29,000	29,000
Poland	—	9,425,000	—	213,000
United Kingdom ..	14,804,000	20,852,000	491,000	496,000
Western Germany ..	11,418,000	12,779,000	—	—

TABLE 2.—*European Solid-fuel Imports in April, 1960, with Figures for March, 1960, shown in Brackets (Metric Tons).*

Importing country.	Coal and patent fuel.	Coke.	Lignite and brown coal briquettes.
Austria	241,000	54,000	22,000
	(303,000)	(65,000)	(39,000)
Belgium	343,000	20,000	7,000
	(311,000)	(24,000)	(9,000)
Denmark	266,000	34,000	10,000
	(269,000)	(61,000)	(18,000)
Finland	97,000	8,000	—
	(145,000*)	(18,000*)	(—)
France	769,000	406,000	16,000
	(803,000)	(415,000)	(13,000)
Greece	8,000*	1,000*	—
	(7,000)	(2,000)	(—)
Eire	122,000*	—	—
	(142,000)	(—)	(—)
Italy	627,000	9,000*	10,000*
	(846,000)	(4,000)*	(10,000*)
Luxembourg	21,000	347,000	11,000
	(20,000)	(367,000)	(13,000)
Netherlands	488,000	24,000	19,000
	(719,000)	(26,000)	(20,000)
Norway	30,000*	13,000*	—
	(35,000*)	(35,000*)	(—)
Portugal	33,000	3,000	—
	(28,000)	(1,000)	(—)
Sweden	103,000*	66,000*	2,000*
	(114,000)	(37,000)	(—)
Switzerland	160,000	18,000	10,000
	(172,000)	(11,000)	(14,000)
United Kingdom	—	—	—
	(—)	(—)	(—)
Western Germany	551,000	47,000	339,000
	(460,000)	(47,000)	(384,000)

* Secretariat estimate.



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Big Rise in French Steel Exports

STEEL production in France during the first five months of 1960 expanded to 7,200,000 tons compared with 6,970,000 tons during the corresponding period last year. Although this represents an increase of 3.5 per cent., the future of the domestic market remains uncertain, and new orders received by large firms are only 1 per cent. higher than a year ago. Nevertheless it is expected that the industry will continue its expansion at the same rate as last year. Exports remain favourable, and domestic sales are slightly higher.

During 1959 French steel exports reached 3,810,000 tons, compared with 2,960,000 tons in 1958, a rise of 30 per cent. This expansion was selective, exports to Franc Zone countries dropping by 21 per cent. The member countries of the European Coal and Steel Community accepted 1,280,000 tons against 770,000 tons in 1958 (65 per cent. up) and exports to the rest of the world rose from 1,640,000 tons to 2,110,000 tons (30 per cent. up).

The export boom in the French steel mills last year played an important part in maintaining the prosperity of the industry, as domestic demand for iron and steel products had been slackening. According to the 1959 report of the French Iron and Steel Association, recently published, total French domestic steel consumption was only 11,900,000 tons against 13,060,000 tons in 1958. It was therefore only because of France's successful sales drive abroad that total steel production increased during 1959 to 15,220,000 tons, against 14,620,000 tons in 1958, a growth of 4.1 per cent.

The French Government's desire to stimulate investment within the framework of the forthcoming Development Plan for 1960-65 has met with the approval of the French steel industry, and although total production capacity at about 17,000,000 tons was 1,000,000 tons lower than scheduled in 1959. it is expected to increase to 18,500,000 tons next year and between 23,000,000 and 25,000,000 tons by 1965.

The industry broke all investment records last year. Investments undertaken over the year totalled 101,000,000,000 fcs., of which 27,500,000,000 fcs. were for rolling mill expansion, 17,400,000,000 fcs. for coking plants and power plants and 17,100,000,000 fcs. for blast furnaces.

Establishment of the European Free Trade Association has begun to take toll of West German exports of metal goods. The Association of Metal Goods Industries reported last week that EFTA's share of metal goods imported from Germany had fallen from 25.7 per cent. in 1959 to 24.9 per cent. The association described this as an undesirable phenomenon. and added that some of its members had begun to find difficulties is exporting to Austria, Portugal and Denmark.

A number of price alterations for steel have been laid before the High Authority of ECSC by Italian producers. They include decreases of 3.9 per cent. for steel ingots by Fabbrica della Maestra, 2.7 per cent. for steel ingots by Meroni Erba, and 2.9 per cent. for ferro-concrete round steel by the same firm, as well as an increase of 1.5 per cent. in steel ingot prices from Galatrossa.

BAKER PERKINS, LIMITED—Mr. L. P. Simpson, works manager since 1956, has joined the board.

Ore Chartering

FURTHER contractions in the demand for tonnage are noted from many of the major loading areas and generally speaking markets are dull. While owners are striving to maintain the last basis of rates paid, it would appear to be a difficult matter to do so.

Although some miscellaneous business has been quoted from the north African coast, there is no particular demand for tonnage to load ore from this area to the Continent. Carthagena/Weser paid 22s. 3d. f.i.o. for 5,000 tons in July. Savona/Barrow 3,200 tons of pyrites residues for the end of June paid 26s. 6d. f.i.o. and trimmed, and a small cargo of 3,000 tons of potash from Barcelona to Terneuzen at 23s. f.i.o. and trimmed for July/August is reported. Further tonnage has been fixed from Konakri to Gdynia or Gdansk, two vessels of 14,000 tons and 15,000 tons, respectively, both in August, at the weaker rate of 27s. 6d. f.i.o.t. Rio or Vitoria 11,750 tons for middle July to Poland paid 49s. 9d. Marmagoa/Holland-Weser range paid 44s. f.i.o.t. for 9,000 tons, July, and 9,500 to Calais at 46s. 9d. f.i.o. for about 9,300 tons, September, and about 9,500 tons from Port Elizabeth to Birkenhead or Middlesbrough, August 10/30, at 50s. with steamer discharging.

There has been some movement in phosphate and a small contract covering three trips for a 9,500-tonner has been arranged from Tampa to the UK commencing August/September at 50s., and 9,500 tons for July 30/August 15 has been fixed at 49s. to West Coast UK. Casablanca/Billingham fixed 4,200 tons for middle July at 36s. and arranged 9,000 tons for July to Sas Van Ghent at 21s. Sfax/Port de Bouc paid 23s. 3d. for 4, 200 tons, early July loading.

Record Outputs for Broken Hill

RECORD outputs of steel ingots, pig-iron, and tinplate were reached in the year ended May 31 by the Broken Hill Proprietary Company, Limited, of Australia. Steel ingot production rose by 10 per cent. to 3,514,000 tons while pig-iron production showed an increase of 341,000 tons to 2,607,000, and tinplate output reached 87,771 tons from 77,140 tons.

Despite this high level of production, the directors state that the group has been unable to meet all sections of demand. For many types of steel longer delivery dates have had to be quoted and no export orders have been undertaken for some months. Steelmaking capacity is being increased at Port Kembla and Newcastle, New South Wales, and the capacity of the rolling mills at both centres is being expanded to cope with this increase. Additional finishing mills are also to be constructed.

Whitehead Iron Interim Rise

INTERIM dividend of Whitehead Iron & Steel Company, Limited, is being raised by 2½ per cent. to 12½ per cent. for the year to end-September, 1960. A final of 15 per cent. makes a 25 per cent. total on the £1,250,000 one-class capital for 1958-59.

Group net income from all sources rose to £787,000 (£416,000) for the half-year to April 2, 1960, before charging tax of £351,000 (£211,000). No allowance has been made in the figures for any allocation to fixed assets replacement reserve.

The forward order-book continues to be satisfactory, it is stated, and in the absence of unforeseen circumstances full-time working until the end of the financial year is assured.